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## GOD'S WORK AND WORD.

If for the FALL of man science comes to substitute the RISE of man, sir, it means the utter disintegration of all the spiritual pessimisms which have been like a spasm in the heart and a cramp in the intellect of man for so many centuries. And yet, who dares to say that it is not a perfectly legitimate and proper question to be discussed, without the slightest regard to the fears or the threats of Pope or Prelate.—WENDELL HOLMES.

IT is surprising that, after the experience men have had of its dangers, the Bible argument in regard to matters scientific should be used by any even pretending, still more by those who actually desire, to be faithful and loyal servants of true religion. Time and again this unwise argument has been employed to oppose scientific discoveries, and time and again its futility has been shown, and the mischief of employing it demonstrated. Strange that some men should be so quick to perceive the manifest truth that the word of God cannot be untrue, so blind to what should be the equally obvious fact that that which is untrue *cannot* be the word of God. Ready to denounce, on the one hand, as blasphemy aught which seems to question the truth of what they regard as the word of God, they never seem to suspect the awful blasphemy of which they themselves are unwittingly guilty in maintaining that to be the word of God which has been shown to be, were it but in the minutest detail, untrue.

Let it be remarked that, with what seems to many the bane, science has ever brought the antidote. If one department of science in its quiet progress has shown that many statements once accepted without question cannot possibly be true, another department of research has with equally calm and patient inquiry shown that those statements never have merited the reverential respect which had been accorded to them in consequence of singular misapprehensions as to their origin. If science has shown—to speak plainly—that sayings regarded by some as the very word of God have been wanting in scientific accuracy, science has been careful to remove all trace of irreverence from such declarations by showing not less unmistakably that there never has been any real justification for regarding those sayings as other than the words of men—thoughtful and earnest men, but with no power of discovering those truths which have been revealed under later scientific researches.

To take one case alone, though I could fill column after column with illustrative instances, it has been shown that in one particular book of a certain heterogeneous collection of ancient books and poems, there are mistakes in regard to scientific matters, misapprehensions as to the meaning of passages in old Jewish poems, and details quite irreconcilable with history as recorded in the pages of Josephus, Philo-Judæus, and other trustworthy writers of the history of their own times. But at the same time that this has been done, it has been shown that that book was most certainly not written by the man whose name has been connected with it, but was compiled long after he was dead. If the writer of that book speaks of the earth as a modern paradoxist might, telling us of an exceeding high mountain from which all the kingdoms of the earth and their glory could be seen, and if the science of later years has been responsible for showing this to be impossible, later science has shown also that the Alexandrian Greek who, somewhere about the year 110, produced the work in which this error (very natural in his time) appears, cannot reasonably be supposed to have been inspired. So with the strange misapprehensions (also very natural, however, nearly 1800 years ago) respecting epileptic, cataleptic, and maniacal seizures, and the elaborate ingenuity with which the Alexandrian Greek displays his very natural ignorance about Hebrew poetry—as in imagining that "the ass and the colt the foal of an ass" were two distinct animals, in misinterpreting (overlooking or forgetting the context) Isaiah's prophecy about Maher-shalal-hash-baz—and so forth. The science of Biblical research has explained clearly enough how natural all this was. And if, whereas science recognises the human race as descended from a race already multitudinous, two genealogies in the collection of Jewish and Alexandrian books agree, though otherwise contradicting each other, in assuming that man was descended from a single pair (the first genealogy, though going back only to the supposed single ancestor of the Jewish race—another impossibility by the way—really assumes the single pair of Paradise), science is at no pains to explain the very natural mistake. Doubtless nothing but a succession of miracles could save the descendants of a single pair from destruction, to say nothing of the renewal of the miracles called for by the destruction of all save four pairs by the flood (each of the three younger pairs starting, miraculously, a branch of the human family), and of the multitudinous repetition of the miracle in the case of all the paired animals of the ark, as also in the supposed origin of distinct human races from single pairs. Science has proved, again and again, that no races descended from a single pair can thrive, if kept "pure" in the technical sense (though so far as certain laws which seem innate in man are concerned this would hardly be the word we should apply to the imagined beginnings of human races). Such races cannot escape degeneration and early destruction. But science, to which the study of history and Biblical research alike belong, has been able to show the conditions under which those ancient writings were produced, and how unlikely it was that their writers should possess knowledge in advance of the knowledge of their day. [In passing I may remark that the first gospel was specially the gospel of the Ebionites, and the only gospel they accepted; yet even they (who probably knew more of their own gospel and valued it more highly than any others) regarded the genealogical record in it as interpolated.]

In like manner, Biblical research has shown clearly on what an essentially human basis—narrow too, being characteristically Jewish—the teaching has been established that the record in the earlier chapters of Genesis (a Jewish compilation from Babylonian documents) is the very word of the Infinite Power from whom all things throughout Infinite Space and during Eternity of Time proceed. For my own part, let me remark in passing, though I am ready to admit the honesty of those who proclaim their belief in this essentially blasphemous idea, I must confess I cannot readily shake off the pain with which I contemplate a doctrine so stupendously repugnant to all sense of reverence for the Power Which—Infinite as It must be in Wisdom, Omnipresent and Everlasting as well as Almighty—must also be Absolute Truth. It is saddening that in our days of en-

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lightenment men should associate with this Power these imagined revelations, whose only support has been the overweening race-conceit of the Jews, and, later, the decisions of bodies of ecclesiastics, who, in advocating the irreverent doctrine that what is inconsistent with facts can be God's Truth, were in reality insisting chiefly on their own claims to reverence.

The trouble has been that this fundamental error, and the errors of detail which have been based upon it, have been treated as though on them religion itself depended, instead of their being the deadweights by which the downfall of true religion has again and again been threatened.

It is hardly necessary to say, however, that science has no quarrel with such passages in those always interesting and sometimes grand old writings as are scientifically unsound. Science no more desires to show that its teachings are an advance on those which seemed plausible and even reasonable in the days of ancient Babylon and Egypt, than the astronomy of to-day desires to show that as a science it is more exact than the astronomy of Shakespeare. There is a great charm in those old-world ideas. Apart from their beauty, they are worthy of scientific study as illustrating the progress and development of the human mind. They suggested highly poetical thoughts to the men of old times—thoughts probably far more impressive than any which have been suggested by the science of our own time, full though it is of beauty and of poetry for us.

But science proclaims her right to pursue her researches altogether unhampered by the ideas of others as to the value of those ancient quasi-scientific speculations. "Why do the [dogmatic] nations furiously rage together and the [unscientific] heathen imagine a vain thing?" If they are right, it is all right; they are bound to come out right in the long run—a result for which they ought to be able to wait, possessing their souls in patience. If they are wrong, they have still more serious occasion to consider their position. Whether science be right or wrong, science can never be justly accused of irreverence. Science reads what she knows to be God's work; and if she err in her interpretation, God who supplied the evidence, and gave to man those powers by which he has been enabled to read it, will not be angry with His creatures' weakness. But they who, not in conscious weakness working for the truth, nor in the darkness seeking out the light, but possessed by the pride of ignorance, claim to denounce their fellow-men's researches, and, loving darkness, confidently call their darkness God's own light—if *these* should be found in error, may not the sin of presumption be charged to them?—though not by science (otherwise occupied), yet by the passionless judgment of pure Truth. The answer of the earnest student of God's laws in nature, under the rebuke of these (the real infidels, since they have no faith in God's work; the real sceptics, since they are ever doubting whether men can safely study God's ways), should be:—

> I claim the right of weakness—I, the babe,
> Call on my sire to shield me from the ills
> That still beset my path, not trying me
> With snares beyond my wisdom or my strength.
> . . . . . .
> Brother, thy heart is troubled at my word;
> Sister, I see the cloud is on thy brow.
> God will not blame me—He who sends not peace,
> But sends a sword, and bids us strike amain
> At Error's gilded crest.
> . . . . . .
> My life shall be a challenge, not a truce!
> This is my homage to the mightier powers,
> To ask my boldest question, undismayed
> By muttered threats that some hysteric sense
> Of wrong or insult will convulse the throne
> Where Wisdom reigns supreme.

## ASTROLOGICAL FANCIES.

LD Paracelsus, explaining, after the confident manner of his day, the claims of astrology to respectful attention, stated that "whereas astronomy deals only with the physical aspect of planets and stars, astrology, nobler and higher, deals with the psychical influences which the souls of the heavenly orbs exert upon the microcosm of man." Observe, man's *microcosm*; nothing short of that. There is something more impressive in the thought that the souls of the sun and moon and planets act not only upon each other, but on the microcosm of man, than even in those sesquipedalian terms of which Guy Mannering made such impressive use in his famous controversy with Dominie Sampson, "signs and planets, in aspects sextile, quartile, trine, conjoined, or opposite; houses of heaven, with their cusps, hours, and minutes; Almuten, Almochoden, Anahibazon, Catahibazon, and a thousand other terms of equal sound and significance." These may overwhelm and stupefy; but for real impressiveness naught can surpass the macrocosmic influences of the celestial orbs on microcosmic man—a conception which it is not given to any man to interpret or understand, whereas Anahibazon and Catahibazon when translated into the vernacular are found to be rather commonplace than otherwise.

But in all seriousness, astrology in its inception was a science—if one ought not rather to call it a religion—deserving of respectful consideration, to say the least. Direct observation was all in favour of the belief that the heavenly bodies influence in a most special manner the fortunes of men. The chief of all the heavenly bodies, the sun, produces such manifest effects both in his daily and his yearly course; the moon seems so obviously powerful over the waters of the sea and in other ways, that it was the most natural thing in the world to assume that the other celestial orbs also have their special influences, though it might not seem quite so obvious what those influences were.

We have, however, to go somewhat farther back for the real beginning of that faith in the powers of the heavenly bodies which so long prevailed among men, and still seems loth to die. There was more in the feeling than the mere result of reasoning applied to observed facts. Astrology was at the beginning a form of animistic religion, and that form which had widest range among the races of men, and penetrated most deeply into their hearts. In the childhood of each race, as in the childhood of the individual man, all natural objects were personified. There was nothing mysterious or perplexing in the process. Every one of us who has a fairly good memory, going back to his quite small childhood, knows just how the personification came about. The young child recognises will and power in all things which seem to act and move of themselves, and retains the idea long after the real source of such apparently independent power of action has been explained to him. The child-man is impressed in like manner with the feeling that all which lives and moves around him acts, as he himself does, in response to the promptings of individual will. He sees, in particular, power outside himself in all that influences his fortunes; and noting, more or less consciously, how the fortunes of the human race are influenced by the processes of nature, he sees, in myriad forms, a "power not ourselves," and not always, apparently, "making for good." The fierce roar of the hurricane suggests a hostile power, and the destruction wrought by the storm confirms the belief in a wrathful being, which has wrought its evil will on men and animals. The crash of thunder and the blasting stroke of lightning correspond in like manner

with the sense of malignant might. The fierce rush of the torrent, the overwhelming destruction wrought by the flood, the fury with which the waves of ocean beat upon the shores or destroy the ships to which men had trusted their lives, all speak of independent powers, destructive and death-dealing. And still more clearly are such powers recognised, still more irresistible do they appear, in the bellowing of the volcano, in the hideous groaning of the earthquake, and in the destruction of thousands of human beings with the stateliest buildings erected by them, apparently by the direct agency of subterranean powers shaking to and fro the solid framework of the earth.

To races impressed, as all human races in their childhood were assuredly impressed, with such feelings as these, the vault of heaven presented a scene still more suggestive of irresistible might. The very calm which seems to reign in the celestial depths enhanced men's sense of the action of constant control, not only over the doings and the fortunes of men, but over all the turmoil and uproar at work when forces nearer at hand exerted for a while their overwhelming yet short-lived forces. The giant energies of subterreanean forces might be more directly suggestive of might than the stately motion of the sun rejoicing as a giant to run his course; the fury of the storm might, while it lasted, seem more terrible than his mid-day heat; cloud masses lowering portentously above men's heads might seem more impressive than the calm blue sky; and the flash of lightning more to be dreaded than the steady lustre of the stars. But those are all short-lasting, and their effects are for the most part transient: these remain year after year, generation after generation; their influences know no weariness; their powers undergo no diminution, and their work is co-extensive with man's domain and as enduring as his race.

Can we wonder, then, if in those days, when the forces of nature, as yet not explained as indicating the operation of law, were worshipped as deities by all human races, the vault of heaven seemed to him the special domain of the most powerful gods, those who from without surveyed and swayed the workings of all inferior powers?—including the fierce energies of the tempest and the flood, the lightning flash and the thunderbolt, the volcano and the earthquake. Beneath that vault, as beneath the dome of the very temple of the gods, men bowed their heads to the rulers of heaven: —the sun, glorious alike in splendour and in power; the moon "walking in glory" and queen over the powers of night; the planets, as they pursued their stately course,

> ——now high, now low, then hid,
> Progressive, retrograde, or standing still.

It was not merely that these orbs seemed to them to move as "radiant Mercuries,"

> Carrying through ether, in perpetual round,
> Decrees and resolutions of the gods:

those orbs *were* gods to man throughout the whole of that long early period of each human race, when as yet the existence of natural laws was not even suspected. Many write in these days about solar myths and lunar myths and star myths, as about nature myths generally, as if the uncultured races of old times, and the uncultured myriads in the times when science was but beginning its career, were moved by special ingenuity to devise stories corresponding to natural processes, to the movements of the heavenly bodies, and so forth. It is far more reasonable, and more profitable too, to think of the uncultured in those days as simply interpreting things as they saw them. Not ingenuity, but extreme simplicity of mind, not profound insight but rather ignorance, must supply the explanation of the earlier ideas of human races. We must try to put ourselves in the position of men who saw all that we see, but knew nothing of what science knows to-day. And we must not be surprised if we find that the mystery amidst which all the phenomena of nature were then involved made men take from the workings of nature their ideas even of religion, in such degree and for so long-lasting a time that the traces of those old beliefs remain still in the ceremonial observances of the best and purest religions of to-day.

And first note that with the men of old times the forces working from outside were regarded as the most powerful. It was because beyond the storm and the flood, the thundercloud, the volcano, and the earthquake, the calm sky looked down unchangingly, that the vault of heaven was recognised as the Heaven-Father. "The great and strong wind that rent the mountains and brake in pieces the rock" had impressed savage races with the sense of power, but even for them "the Lord was not in the wind." And after the wind—as mightier even than the fiercest storm—"the earthquake; but the Lord was not in the earthquake; and after the earthquake, fire; but the Lord was not in the fire." For long ages, however, for generations unnumbered, the Lord was in the high heaven. *There* was the true Olympus, whence the influences of the supreme powers were exerted upon the races peopling this earth.

The heavenly powers thus ruling were ranged in influence according to their distance, which was not regarded as mere distance, but as height and as measuring dignity. The moon was not simply the nearest, but the lowest of the heavenly powers, a position by no means inconsistent with her character as the ruler of the night and queen of the stars. And passing to the other extremity of the scale of dignity, the planet which, as of longest period, they regarded as the outermost, was the "highest" (even Galileo wrote of Saturn as the highest planet—*Planeta altissimus*); and to Saturn, accordingly, was assigned the most potent influence of all. From outside the orbs of all the other planets he seemed to watch and control all their movements, and therefore all their influences. Chaucer caught the right idea of the old astrologers respecting Saturn, when, mixing up rather quaintly the planet and the god, he pictures the father of the gods as telling Venus of his wide path and of his great power (as in some way associated together)—

> My dere daughter Venus, quod Saturne,
> *My cours, that hath so wide for to turne,*
> *Hath more power than wot any man.*

Having naturally been led to adopt the belief that the earth and all terrestrial powers were ruled by the orbs of heaven, and that these orbs were higher in dignity and influence as they were more remote, men of old times sought to ascertain in what special way each of these heavenly rulers made his power felt. The influence of some of them was so obvious that they might well believe it within their power to determine the influence of all. Never did the prospects of fortune-telling look more favourable than in the day when men set themselves the task of endeavouring to ascertain in what special ways Mars and Venus and Jupiter, the swiftly moving Mercury and the slowly moving widely travelling Saturn, affected the fortunes of men.

For as to the sun and moon there could be no manner of doubt. Astrologers had no occasion to ask whether the sun's favouring rays brought wealth to men, since even the earth brought forth wealth at his bidding. It belonged, perhaps, to a very early stage of human development to imagine that the sun ruled when it was day, and was in a sense the god of day rather than the actual bringer of day.*

* A modern story of the Joe Miller type tells indeed of an Irishman who said, "Divil thank the sun for shining in the daytime;

It was, however, by no means so childlike a thought that the sun rules the year, or, rather, rules that half of the year during which he is above the great dividing circle which separates his grave in winter from his throne of glory in the middle summer. The idea of direct physical causation, which in our time connects the sun and the life-giving warmth of summer, belongs to the scientific thought of times so recent that in reality their beginning is as of yesterday. Men would have regarded it as a wild and fanciful notion, if not in some degree blasphemous, to suggest that the sun nourishes the fields in the same way precisely that a fire on the hearth nourishes those around it—by its warmth. Even had that idea been accepted, the actual growth of herbs and flowers would still have appeared to respond mysteriously to solar influences. For men understood as little about plant life in those days as about the laws and nature of heat. Seeing then, as they thought, that the sun exerts mystical influences over the growth and development of the herbs of the field and the trees of the forest, men felt well assured that he exerts psychical influences on the microcosm of man. Herbs yield fruit after their kind, and bring forth their hidden wealth in response to solar rays: men and nations, then, must owe their wealth and prosperity to the mysterious influences of the sun.

As for the moon, passing over the very early teaching which regarded her as ruler of the night—an idea which, as it certainly does not correspond with the facts, led Milton to cause the moon's orb to be painfully diverted from its original and mathematically impossible track—we can see that her sway over the tides would be regarded by all men as indicating a mysterious form of power. When we consider that the tides were not explained at all till the time of Newton, were even by him wrongly explained at the outset of his inquiries, and (owing perhaps to his mistake then) are still wrongly explained in at least ninety-nine text-books of astronomy and geography out of a hundred,* we cannot wonder if a strange mystery was recognised in the tidal sway of the ocean, when, as yet, the law of universal gravitation had not even been imagined. The moon seems also in some way to influence persons of weak mind. It is no idle fancy that lunatics and idiots are influenced by the moon, though it is indirectly, not directly, that she affects them. They are disturbed by the light of the full moon during the night; and, being thus disturbed, their mania or idiocy becomes for a while more marked and manifest.

With regard to the planets—the other planets as they were considered, for the sun and moon were planets in those old times—men could only reason by analogy. Since two of the planets do thus manifestly influence things terrestrial, so also in all probability do the others. All that was necessary was to ascertain in what way each planet acted. And this, they supposed, might be done by careful watching.

Unfortunately, they started with views respecting the influence of each planet leading them to expect certain results, which accordingly they soon persuaded themselves (so prone are men to recognise significance in casual coincidences) that they *had* found. Mercury was a planet hard to detect, swift in his movements, and often hiding himself in the sun's rays; he therefore might well be supposed to influence the fortunes of all men engaged in business requiring craft and subtlety. Venus, lovely on "the daffodil sky that she loves," was naturally chosen as the planet of love. Mars, ruddy and fiery in aspect, and changing strangely also in lustre, seemed an equally appropriate ruler over war. Jupiter, stately in motion, and splendid in aspect, influenced the fortunes of those who have rule and sway over men. And lastly, the sad and slow-moving Saturn suggested evil fortune and gloom.

It was not very wonderful, possessed as men were with these notions, that the observations which they made on the planets confirmed them in their fancies, foolish though these now seem to be, as, indeed, they are in the light of the facts now known.

## SHAKESPEARE SELF-DRAWN.

By BENVOLIO.

### FIRST PART OF "KING HENRY VI."

AS "Titus Andronicus" presents Shakespeare's first efforts in tragedy, while "Love's Labour's Lost" is the first of his comedies, so the First Part of "Henry VI.," whatever portion we attribute to Shakespeare's pen, must be regarded as presenting his first efforts in English historical drama, which, during the reigns of Elizabeth and James I., had, as we know, a special interest for English playgoers. The very worthlessness of much that we find in this play is instructive, for it shows how intense that national feeling must have been which could enjoy the exhibition of inferior plays such as this, nay, even be moved (as Nash tells us) to tears at the representation of the ill-fortunes of Talbot, Salisbury, and Exeter. It is certain that the value of the old English historic subjects for theatrical purposes had been recognised long before Shakespeare came to London. There can be very little doubt that the greater portion of at least the First Part of "Henry VI." had been already used in its present wording before Shakespeare took part in the representations. And there are good reasons for believing that some time passed, after that, before he was allowed any voice in determining the actual form in which this particular play should be presented. When this happened it is probable that at first he was unwilling to believe that he was himself a much better judge of what was fitting and effective than Greene (his senior by but four years, but by a longer interval as a dramatist), or even than Marlowe, whom Shakespeare (if we can judge by the consideration that imitation is an expression of admiration) seems to have regarded as the most powerful dramatist of his time. Shakespeare was very slow, in all probability, to suggest excisions, changes, or additions. Greene was almost certainly unwilling, Marlowe probably ready, to recognise the true judgment of the younger dramatist—younger, that is, as a dramatist, but of the same age counting by years as Marlowe. Hence, probably, the ill-feeling displayed by Greene in his "Groat's Worth of Wit."

I do not propose here to discuss the question of the share

if he shone at night, bedad, there would be something to thank him for!" But that Irishman, assuming (which seems unlikely) that he ever existed, must be regarded as a reversion to a very remote ancestral type.

* Nothing can be much more amusing to the mathematician than the grave repetition of that supposed explanation of the tides, which begins and practically ends with the statement that under the moon's attractive influence the waters on the side of the earth towards the moon would be raised, and also the waters on the side remote from the moon. This is true, doubtless, precisely as it is true that if a top—not spinning—be set aslant on its peg, it will topple over unless supported; but precisely as this statement would be thought a very unsatisfactory explanation of the reeling of a spinning-top when its axis is aslant, so is the common account of what would happen with the seas were the earth not spinning a most insufficient explanation of the entirely different behaviour of the actual seas. It is not commonly known that instead of *high* water under the moon and opposite, there would be *low* water—but for frictional resistance .

which Shakespeare had in the production of the First Part of "Henry VI." So far as Shakespeare's own character is concerned (about which we are endeavouring to gain glimpses from his plays) it may be said that this particular play tells us more by that which is indubitably not Shakespeare's than by the passages which may with more or less confidence be assigned to him. I have already, however, considered the play in that particular aspect. I shall here content myself by touching on some portions of this play which seem undoubtedly touched by Shakespeare's hand, even if all of them have not come direct from his pen, and contrasting them with others which seem as certainly to have come from other hands.

The first seven lines of the play seem as clearly to come from different pens as the play itself regarded as a whole. It would be absurd to suppose Shakespeare wrote the last two of these seven lines:—

> King Henry the Fifth, too famous to live long!
> England ne'er lost a king of so much worth.

While the four lines immediately preceding might well have come from his pen:—

> Comets, importing change of times and states,
> Brandish your crystal tresses in the sky;
> And with them scourge the bad revolting stars,
> That have consented unto Henry's death!

though there is nothing enabling us definitely to assign these lines to Shakespeare. Greene and Marlowe frequently refer to astrological fancies; and the tone of a later reference of the kind:—

> Mars his true moving, even as in the heavens,
> So in the earth, to this day is not known,

recalls rather Greene's occasionally pedantic affectation of learning (a fault shared also by Marlowe) than Shakespeare's manner.

The following lines read like Shakespeare's work:—

> Expect Saint Martin's summer, halcyon days,
> Since I have entered into these wars.
> Glory is like a circle in the water,
> Which never ceaseth to enlarge itself,
> Till by broad spreading it disperse to nought.
> With Henry's death the English circle ends;
> Dispersèd are the glories it included.
> Now am I like that proud insulting ship
> Which Cæsar and his fortunes bare at once.

The Countess of Auvergne's comments on Talbot are decidedly Shakesperean in tone:—

> Is this the scourge of France?
> Is this the Talbot, so much feared abroad,
> That with his name the mothers still their babes?
> I see, report is fabulous and false:
> I thought, I should have seen some Hercules,
> A second Hector, for his grim aspect,
> And large proportion of his strong-knit limbs.

[Compare with the last two lines Elinor's description of Faulconbridge, "King John," act i. scene 1:—

> Do you not read some tokens of my son
> In the large composition of this man?]

Yet the greater part of the scene between the Countess and Talbot is not at all in Shakespeare's style.

The fourth scene of act ii. is by general consent attributed wholly to Shakespeare. No one else, Greene or Peele, Marlowe or Nash, could have written it as it stands. It presents, too, all the signs of having been produced by one hand and at one time. The quality of the work is uniform and consistent. Thoroughly Shakespearean is the skill (evidently unconscious) with which the characters of Suffolk and Plantagenet, both alike fiery, are differentiated, while Somerset, cool even in his wrath, is strongly contrasted with either, and with Warwick, quiet but resolute throughout. There is perhaps a touch of gentle Will Shakespeare's nature in Plantagenet's "Thanks, gentle sir," specially addressed to the unnamed lawyer, whose tone in the few words he speaks indicates his comparatively lowly station.

Very little in acts iii. and iv. seems like Shakespeare's work. The characterisation of the Maid of Orleans, here as throughout, is not only unworthy of Shakespeare, but wanting in dramatic unity. Yet there are lines which few but Shakespeare would have written in those days. For instance, Burgundy's

> Warlike and martial Talbot, Burgundy
> Enshrines thee in his heart, and there erects
> Thy noble deeds as valour's monument.

And La Pucelle's

> Look on thy country, look on fertile France,
> . . . . . .
> As looks the mother on her lowly babe
> When death doth close his tender dying eyes.

These passages, whether Shakespeare's or not, were certainly not from the same hand which wrote York's silly lament:—

> He dies, we lose; I break my royal word;
> We mourn, France smiles; we lose, they daily get;
> All 'long of this vile traitor Somerset.
> . . . . . .
> Lucy, farewell; no more my fortune can,
> But curse the cause, I cannot aid the man—
> Maine, Blois, Poictiers, and Tours are won away,
> 'Long all of Somerset and his delay.

The fifth, sixth, and seventh scenes of this (fourth) act are certainly not Shakespeare's. Probably the rhymed portion which forms nearly the whole of these scenes is from a pen which produced no other part of the play as it stands. But the first lines of scene 5 read much like Shakespeare's work, and seem even suggestive of Shakespeare's nature:—

> O young John Talbot! I did send for thee
> To tutor thee in stratagems of war,
> That Talbot's name might be in thee revived,
> When sapless age, and weak unable limbs,
> Should bring thy father to his drooping chair.

If Greene, however, did not (to use his own words) "bombast out" the "blank verse" following, I know not who, unless perhaps Marlowe, can have written them:—

> Is Talbot slain?—the Frenchman's only scourge,
> Your kingdom's terror and black Nemesis?
> O, were mine eyeballs into bullets turned,
> That I, in rage, might shoot them at your faces!
> O, that I could but call the dead to life,
> It were enough to fright the realm of France:
> Were but his picture left among you here
> It would amaze the proudest of you all.

Shakespeare certainly never wrote this bombastic nonsense. But very likely Shakespeare added the answers in which La Pucelle ridiculed Lucy's bombast. Possibly it was thus he offended Greene.

The parts relating to La Pucelle in the fifth act we may safely assign to another hand than Shakespeare's. There are some who regard the wooing of Margaret by Suffolk as Shakespeare's; but there are passages in it too feeble and too false to nature to be his work. Some lines are almost certainly his, as Suffolk's:—

> So doth the swan her downy cygnets save,
> Keeping them prisoners underneath her wings.
> . . . . . .
> O, stay! I have no power to let her pass;
> My hand would free her, but my heart says—no:
> As plays the sun upon the glassy streams,
> Twinkling another counterfeited beam,

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So seems this gorgeous beauty to mine eyes.
Fain would I woo her, but I dare not speak.
. . . . . .
She's beautiful, and therefore to be woo'd;
She is a woman, therefore to be won.

But no one can imagine that Shakespeare wrote the lines :—

SUF. I'll win this Lady Margaret! For whom?
Why, for my king! Tush! he's a wooden thing.
MARG. He talks of wood. It is some carpenter.

Many parts of this scene, as indeed of others in the play, read like actors' gag, showing rather what was thought likely to please the groundlings than what any of the dramatists of the company could have deliberately written.

## MR. DONNELLY'S CIPHERING.

As the calculation of chances seems to be bewildering to many, and specially imposing when it runs into large numbers, I deem it desirable to caution the non-mathematical community against Mr. Donnelly's truly bewildering and in a twofold sense imposing statements in regard to the evidence of the "law of chances" in favour of his cryptogram. He evidently understands the doctrine of chances as little as he understands the cipher Bacon really invented—or rather, as little as he understood that cipher before the *Pall Mall Gazette* explained to him its working in the capital article, "A Mammoth Mare's Nest." I suppose he understands that system now, though, strangely enough, in his "case for" his "Cryptogram" he nowhere thinks it necessary to explain how he came so thoroughly to miss the sense of Bacon's clear explanation of the five-letter cipher. (In passing I may note a point which the author of "A Mammoth Mare's Nest" omitted to mention, viz., that the passages used by Bacon in illustration of his cipher were originally, like the body of the work, in Latin, so that Mr. Donnelly's ingenious idea of "capitalising" ALL and IS in a passage which chances to contain these words out of the sentence "All is lost," is seen to be singularly ludicrous—the Latin being *Perditæ res*, and no such word as *perditæ* appearing in the passage quoted by Bacon from Cicero—*Ego omni officio ac potius pietate erga te*, &c.

Mr. Donnelly offers to reveal to the editor of the *Pall Mall Gazette*, in confidence, his fundamental cipher-number, if it be acknowledged that the thousands of words in his story cannot have come out by accident. He illustrates what he takes to be the nature of the chances as follows :—If the number were 740, "there are 739 chances to 1 that the cipher word needed will be the 740th; if, now, the first six words of the Lord's Prayer are found, each of them standing as the 740th word, one after the other, in a composition, there is but one chance against 232,065,922,400,000, or one chance against 232 *trillions*" (our more sensible English system of numeration would say *billions*) "that this could happen by accident." And he goes on to speak of the practically infinite chances against the whole of the Lord's Prayer being found in the same systematic manner.

There is not the least semblance of correctness in any of the statements made in regard to this illustrative case; though I am bound to admit that if there had been, if even every word of the argument were sound, the case would not be in the slightest degree illustrative of Mr. Donnelly's work, so that his position will not be at all weakened (it could not possibly be weaker than it is) by my showing that his chance argument is all (in the Baconian cipher) Chron *onhot onth*o log*os*! as the "Mammoth Mare's Nest" article justly says of the whole cryptogram—a mystic word which, being interpreted, signifies BOSH!

The chance that any particular word will be the 740th (counted from any assigned place) is no more to be regarded as 1 in 740 than as 1 in 10, or 20, or 1,000. Counting any number of words brings us to *some* word, whether we count 10, or 20, or 740, or 1,000; and the chance that that word will be some particular word, named beforehand, is not affected by the number of words we count: it is simply the chance that a word taken at random will be that particular word. This chance depends on the nature of the word itself. We are more likely to be led by our count to such a word as *a*, *the*, *and*, *is*, *it*, or *to* than to such a word as *cryptogram* or *impecuniosity*, because in any composition simple words occur oftener than complex ones. To put a fixed and definite chance down for each of the words *Our*, *Father*, *who*, *art*, *in*, and *Heaven* indicates complete misapprehension of the doctrine of probabilities—even of its merest elements.

One can see what Mr. Donnelly tried to do, fondly imagining he was applying the law of chances. Having six words, he sets the chance of these occurring at 1, or *certainty*, for the first word (since some word *must* be reached to start with), and at $\frac{1}{740}$ for each of the other five. Thus the chance for the six is 1 in 740 raised to the fifth power, or $740 \times 740 \times 740 \times 740 \times 740$. He has gone wrong in his ciphering—naturally—for the fifth power of 740 is 221,900,662,400,000, not 232,065,922,400,000; but this is fair work for Mr. Donnelly, and much nearer than he gets in working out his own cipher system.

Mr. Donnelly shows later his utter misapprehension of the law of chances by inviting us to apply that law to determine how many quintillions there are against one that the coherent words (!) "with his quick wit and his big belly" would come out by accident from his free-and-easy system of counting. The law of chances has no bearing on such a question. One might as reasonably ask that the law of chances should be applied to determine how many quintillions to one there are against the adoption by Bacon of an imbecile cipher-system to hide under a rubbish-heap what we are told he was painfully anxious to disclose; or to find the odds against Bacon's writing in bad Victorian English the feeble and scurrilous twaddle attributed to him in "The Great Cryptogram"; or to determine the chances that Bacon, or even Shakespeare himself, hampered in his writing by the multitudinous conditions imagined by Mr. Donnelly, could produce a noble play; or lastly, to indicate the probability of that man detecting a recondite though semi-idiotic cipher-system who had failed to understand the simple and sensible system really invented (and clearly explained) by Bacon himself.

The real problem in chances involved in Mr. Donnelly's work has been, throughout, simply the following :—

*When, at any stage of his progress, Mr. Donnelly has needed a particular word, what has been the chance that, with the varied ways in which he permits himself to count, he will reach that word, making his count apparently correspond with one of those ways (modified by one or other of his various methods)?* This chance cannot be determined mathematically, but from such study as men of sense can afford to devote to Mr. Donnelly's work, it is obvious that the chance is at least ten thousand to one.

*Per contra*, here is another question in chances not mathematically determinable :—

Granted that, as more than one critic has pointed out, "any one can construct any kind of narrative" out of any volume whatsoever, after Mr. Donnelly's fashion, what is the chance that any one else will do it? "*It will be observed*," says Mr. Donnelly in italics, "*that no one has*

*yet done it*"—except himself. Now that he has done this thing, we may safely infer that the odds are about a thousand millions (the number of the adult population of the world) to one against its being ever attempted again. Let us, at least, devoutly hope so.

## A BOTANICAL ATROCITY.

By MILLER CHRISTY.

AMONG all the many ingenious contrivances for effecting her various ends which Nature makes use of, none are of a more fascinating interest to the student than those by means of which the flowers of plants are fertilised and their seeds distributed over the ground to spots where they may hope to obtain a foot-hold—or, to speak more correctly, a root-hold.

We are all of us accustomed to speak glibly of the "struggle for existence," and we are apt to think that nowhere throughout the whole wide range of nature is this struggle more severe than in the case of our own exalted species, in these days of excessive "competition" and "over-population." But a little reflection may well lead us to doubt whether this is really so, and even to perceive that the struggle is much keener with many other species than with our own. How many, for instance, of the nine millions of ova found in the roe of a single codfish ever produce a mature fish? How many, again, of the tiny wriggling tadpoles that blacken the margins of our country ponds in spring ever attain maturity as full-grown frogs? And what proportion of the seeds produced by any one plant or tree ever finds itself so fortunate as to be able to take root and grow, unsmothered by the surrounding vegetation? Probably, in all these cases, not the one-hundredth part survives to reach maturity. Were it otherwise, indeed, the ocean would quickly become packed solid with codfish, the land overrun with frogs more numerous than at the time of the second Egyptian plague, and the surface of the soil entirely concealed by a dense mass of impenetrable and tangled vegetation. An "infant mortality" so prodigious, in our own species, would certainly appal even the soulless official mind of a Registrar-General.

If, then, the struggle for existence is so severe in Nature, it can hardly be wondered at that many exceedingly ingenious contrivances have been, in the course of time, devised by plants in order to ensure the wide dispersal of their seeds, so that each may enjoy as good a chance as possible of alighting upon some spot where there is sufficient room for it to germinate into a healthy plant. It may be truly said that, as a general rule, with all living things the chief aim and object of their lives is the perpetuation of their species by means of offspring. With plants this is well shown by the extreme ingenuity of many of the contrivances for ensuring proper fertilisation, and the consequent production of good seed. And it may, I think, be said, with equal truth, that second only in importance to this great function, the production of seeds, comes the proper dispersal of those seeds, to which end many almost equally ingenious devices have been adopted. Very many seeds are furnished with minute hooks which fasten themselves on to the wool of passing animals, and thus accomplish the great end in view; others are peculiarly adapted for dispersion by means either of wind or water; others are scattered broadcast after passing through the intestines of birds; while many plants have actually developed means for throwing their seeds to a greater or less distance. There are even some seeds which, in thus effecting their own ends, do so at the expense of living animals; but no known seeds, probably, employ means more atrociously and barbarously cruel than those employed by the seed of a species of grass, known as *Stipa spartea*, which is excessively common over a large extent of the North-American prairies. Briefly described, this villainous instrument is nothing more or less than an automatic vegetable corkscrew, with an exceedingly sharp point, and capable, by its own action, of boring itself into the bodies of living sheep and other animals, and of finally killing them by so doing.

The plant producing this "instrument of torture" has a very wide range of distribution in America. It inhabits the drier portions of the plains and prairies of the west, almost, if not quite, from the Mississippi River on the east to the Rocky Mountains on the west, and from Texas and Mexico on the south to the lonely Peace and Saskatchewan Rivers on the north. The great and only redeeming feature in its character is that, for purposes of pasturage, its leaves are more succulent and valuable than those of any other of the prairie grasses, and that, although too short and tussocky to be made into hay, they formerly provided the buffaloes with their chief winter forage, and now perform the same office for the tame cattle on many a western ranche. On this account it has received, among other popular names, that of "buffalo grass"—indeed, its range in the west of America is pretty nearly co-extensive with the ancient range of the buffalo.

During autumn, winter, and spring, the buffalo-grass is in all respects a most moral and respectable plant; but, early in the summer, it begins to plan evil ways. First of all it throws up three or four tall flower stalks, each about a couple of feet in height, and bearing six or seven of the horrible instruments of torture already mentioned. These ripen about the middle of July, and for the next two or three weeks make themselves troublesome, not only to the lower animals, but also to man, in districts where the plant grows abundantly. It now is fully launched upon its evil ways, and begins to deserve its other popular names, as "spear-grass," "oat-grass," "go-devil-oat," "wild-oat," "needle-grass," &c. As one walks over the prairie at this time of the year, suddenly there comes a sharp prick, as of a pin, on the leg, just above the ankle. Stop one must, to investigate the cause, or the pricking will become more severe, and then the traveller finds that one of these seeds, and very often several, has bored its way clear through one's trousers and sock till it has reached the flesh. With man it is an easy matter to prevent the mischief going any further, but the case is very different with sheep, woolly-haired dogs, and other animals. These cannot rid themselves of the "spears" the moment they begin to prick, and in time the consequences begin to be serious. There is no question that the seeds are able to penetrate the skins, and bury themselves deeply in the flesh of these animals. When this is done, death sometimes supervenes, though oftener as a result of the extensive ulceration thus set up, than as a result of the direct action of the seeds.

Next, a word as to the structure of these unpleasant natural tormentors. In general appearance a complete seed—or, to speak with greater botanical precision, a complete "fruit"—a good deal resembles a twisted piece of wire, having several slight bends in it, and being rather thicker in some places than in others. The seed proper is elongated, brown in colour, somewhat less than an inch in length, and generally not very unlike a harmless oat in its appearance. At one end, however, it is provided with an excessively fine sharp point, surrounded with many delicate barblike hairs, pointing backwards; while at the other end it is produced into a stiff, slender awn, or shaft, rather less than two inches in length. This portion is

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usually quite straight, though always sharply twisted up upon its own axis, seven or eight revolutions being usually observable. At the top of the shaft there is a bend, usually somewhat larger than a right angle, which is termed the "lower knee," and in about half an inch another sharper bend, which has been called the "upper knee," after which the awn is still further produced into a stiff tapering bristle, somewhat less than three inches in length, entirely untwisted, and set with many exceedingly minute but sharp teeth, all pointing backwards. The whole apparatus, for such it may be called, is thus about six or seven inches in length. A glance at the accompanying illustration, however, will give a clearer idea of the seed than the most elaborate description.

The foregoing is a description of the instrument when in a perfectly dry state. On its becoming wet, the "hygrometric

Awn of Stipa Spartea (in its dry or twisted state).

action" of the awn (as it is called) comes into play, and the appearance of the whole contrivance quickly becomes changed. The shaft then begins to untwist, the knees commence to straighten, and in a short time the whole awn becomes perfectly straight from end to end, so to remain until it is again dried, when the former twisted and bent condition is resumed. This curious power of untwisting and straightening itself when moistened, and of again twisting up when dried, seems to continue for an almost indefinite time — probably until the awn commences to undergo natural decay. It is a power which is also possessed, though in a less fully-developed degree, by various other seeds. In most, if not all, of the members of the genus *Stipa*, in several other grasses, in some of the Erodiums, and even in the common wild oat, this curious hygrometric peculiarity of the seed is observable.

Let us now examine how this power aids the seed in its nefarious designs. It is in this way: Suppose a ripe awn, in its dry or twisted state, to have become entangled in the wool of a sheep, or to have fallen among the grass. It there remains inactive, until moistened by a shower of rain or a heavy dew. Then, as we know, the shaft commences to untwist, rotating the point of the seed; for, as the bristle or arm of the awn forms at first a right angle with the shaft, it is certain to catch in the grass or wool, and thus prevent the head of the shaft from revolving as it untwists. But all this time, as we also know, the "knees" are straightening, raising the arm and causing it to press upwards. In rising it will probably press against a blade of grass or catch in the wool, its many fine teeth affording it a more or less firm hold upon either. Under these circumstances, the continued efforts of the arm to rise will have the effect of pressing forward the revolving point of the seed, causing it to penetrate slowly and by degrees into the flesh of the animal, the ground, or any other sufficiently soft substance which may be opposed to it. Thus our automatic boring-apparatus will be in full operation. Having penetrated to a slight depth, the barb-like hairs round the point prevent it being withdrawn when the awn re-twists on again becoming dry; so there it remains, ready to penetrate further and further as often as succeeding drought and moisture cause the awn to twist and untwist again.

There is, as has been already said, no question that the seeds are in this way able to penetrate the skins of animals and actually enter the body. On the plains of the West its possession of this power is well known, and I have myself often seen and heard of instances of its effect. I have never, it is true, actually seen a sheep that had been thus killed, because sheep are not allowed to die of it, but are killed for the butcher. There is, however, not the least question that the seeds have the power of causing death, either directly or indirectly. A recent American writer, speaking of this subject, says that, after the seeds have penetrated the skin, "the awns break off, and the needles penetrate the vital part of the sheep, causing painful death. . . . The points, too, not only enter the body of the sheep in this way, but also stick in the nostrils, nose and lips, where, however, they do less harm than when eaten and swallowed into the stomach, in which event death must follow." I have been repeatedly assured when "out West," by butchers and others, that the "spears" are very commonly found beneath the skins of sheep after death—especially about the shoulders—indeed, I have myself seen them in this position, while I have been several times told by settlers of sheep they had been compelled to kill, "to save their lives," as Irishmen are supposed to say. I have, moreover, demonstrated that the seeds do possess this power by experiment in England. Some seeds, which I placed among the wool of two sheep, quickly penetrated to a depth of half an inch, after which I removed them, thinking that the animals were probably less interested than myself in the result of my experiment. Indeed, the keeping of sheep on the Western prairies would be rendered almost impossible, on account of the prevalence of this deadly grass, were it not for the fact that its evil effects can be avoided by a few simple precautions, such as a careful examination of the sheep during the time the seed is ripe, or "folding" them during the same period.

But sheep are not the only animals that suffer. Woolly-haired dogs are almost equally troubled, if proper care be not taken. I have heard of such dogs having, like the sheep, to be killed "to save their lives," when the whole of the breast and stomach has been found to be a mass of ulceration. I have also heard of a colley, which came so thoroughly to understand the nature of the "spears," that he would never enter the long grass while they were ripe; while one settler told me that he had found it necessary to shave his dog all over when the "spears" were ripe, to prevent their catching in his long matted hair.

Now, could any epithet be too strong to describe correctly a seed which conducts itself in such an atrocious manner? I think not. It must, however, be confessed that it is a little difficult to see exactly how the plant is benefited by its seeds being introduced into the bodies of animals. Their dispersal would, it is true, be usually assured, but the great object of that dispersal—namely, germination—would

probably be deterred, unless it be that the seed has some strange power of retaining its vitality for a long period after its burial in the flesh of a sheep. It can hardly be supposed that the seeds are intended to grow there, or we should be presented with the strange spectacle of the sheep growing their favourite food on their own bodies! But this is too absurd. It may, perhaps, be that the simple and beautiful piece of mechanism possessed by the seed of *Stipa spartea* is simply to enable it to bury itself securely in the ground where it may take root—to sow itself, in fact; but, if so, what shall be said of the plant which uses such a power for such murderous purposes as have been described? The whole matter is not yet quite cleared up.

## RUDE CENSURES ON BRITISH RUDENESS.

IN the American monthly *Forum* for July there is a paper on English and American manners, by an American rejoicing in the name of T. W. Higginson, the object of which is to show that English breeding is entirely inferior to the American article. Mr. Higginson relates several stories of Englishmen who have been wanting in courtesy, either to himself personally or to other Americans, some of these stories certainly indicating considerable rudeness, though one would like before condemning to know something more of the facts—for it is not absolutely impossible that the discourtesy of the Britisher may have been provoked by equal or greater discourtesy on the part of the American. For instance, a certain lord to whom Mr. Higginson refers may have been wanting in politeness; but when we find the American who undertakes to teach Englishmen manners deliberately naming this lord in his article, telling us how he spoke of his rudeness to an English lady, and quoting her reply that the manners of that family (naming it again) are proverbial, we begin to recognise the extreme probability that the American who thus shows himself ignorant of the essential principles of propriety may have moved the Englishman to be sharp and abrupt with him. In like manner he tells us that a well-known novelist spoke offensively at the table of an American whom he names, and goes on to say that "he took the liberty to sound the Englishman on the subject." The reply suggests pretty clearly that the Englishman had had no thought of offending, but had merely expressed when invited his opinion on some custom approved in America, but not liked elsewhere. "I give you my word of honour," he said, "that I have often felt it my duty to make remarks which were much more offensive to my host than anything I can possibly have said here"—meaning obviously (though I expect the wording of the reply has been altered) that in England he would give his opinion much more decisively, without in any way offending—since in England, when a man's opinion is invited, he is expected to give it truthfully, and no offence is taken if it chances to be unfavourable. But Mr. Higginson, who has offended grossly against propriety in relating the story, and by his own account took a great liberty on the occasion itself, confidently interprets the Englishman's reply to mean that he took pleasure in causing annoyance, and "measured his merit by the degree of annoyance he caused." He adds to the offence by implying that what he charges (unfairly in all probability) against this particular Englishman, all Englishmen are always doing.

Mr. Higginson's whole article is in fact a gross offence not only against manners, but against the principles on which good manners depend. Apart from the rudeness shown to our people, the article is full of offensive and quite unjustified brags about Americans. Mr. Higginson must know that American public schools, whatever other excellent qualities they may have, are not scenes where absolutely perfect manners are displayed (even in the East, while in the West they might be often described in much stronger terms). He must be well aware, also, that if any Englishman cared to follow Mr. Higginson's offensive course and present carefully selected examples of ill manners as correctly indicating the character of a race, he need not look beyond the very circles which Mr. Higginson chooses to describe as trained to perfect manners—the secret societies, with their lodges, chapters, and circles, their gaudy trickery of dress, their preposterous titles, and the rest of their trumpery. It would be most unfair to say that because among the members of these orders you may meet examples of gross rudeness, therefore they are all ill-mannered and discourteous—though not more unfair than it is for Mr. Higginson to attribute to the whole of the English aristocracy the bad manners which he ascribes (probably falsely, since even if he is striving to be fair he is obviously a very poor judge of manners) to one or two whom he has met or heard of. But if one were disposed to be as unfair and as offensive as he seeks to be, one might repeat a sentence of his most effectively (with a slight change in its significance): "Much of the habitual politeness with which Americans of all classes treat one another, in travelling and in business, comes doubtless from the friction and the examples of the lodge-room." Ninety-nine Englishmen of the more cultured classes out of one hundred, who have travelled or done business in America, would be rather disposed to recognise the reverse of politeness as habitual among Americans in business and in travelling—only the hundredth remembering that this is because all classes travel and do business together in America, whereas in England the better bred keep apart from the rougher members of the community. But certainly if an explanation of the "politeness" (negative), that is, of the rough and uncivilised ways very often to be observed among Americans, were to be sought, the reason assigned with another meaning by Mr. Higginson would probably serve.

For my own part, I will frankly admit that I am often exceedingly annoyed with my fellow-countrymen in America, because of what seems to me unnecessary fault-finding. But although I have not been unready to protest against it, both in public and privately, even when it has not been unfair, I must confess that the English fault-finding I have heard about things American has not been comparable for virulence with the American fault-finding I have heard about things English. The ways of (too many) Americans in this respect are well illustrated by Mr. Higginson's article. He rebukes English manners because of a few cases in which, according to his account, Englishmen have not sufficiently admired American ways; and he shows how much he really objects to such want of consideration for American feelings by insulting and abusing England and Englishmen.

Mr. Higginson enters into details to show his sensitiveness. He tells us that no time can reconcile his American ear to the heartiness with which an otherwise well-bred English lady will talk frankly of "tubbing" and "cleaning herself." (One can judge from this in what classes Mr. Higginson has sought for samples of English manners. I will undertake to say that no English lady ever speaks, in social converse, about "tubbing"—I doubt if any English lady ever uses the expression—while a woman who should speak of "cleaning herself" would be set down by an Englishman as undoubtedly a servant-girl, charwoman, or the like. He would not be deceived either into regarding

her as "otherwise well bred," though her breeding might "otherwise" do very well for Mr. Higginson.) This fastidious American is troubled because the most eminent of English poets spoke of some bad verse as "rot," and because Mr. James Payn wrote, "I hate people who 'stink' of money."* *Quis tulerit Gracchos de seditione querentes?* The countrymen of Mark Twain, Bret Harte, Artemus Ward, and a host of others who have written whole pages of coarse buffoonery (but also much exquisite fooling), speaking of a strong word or two from Englishmen is a trifle too rich. Does Mr. Higginson imagine that because Americans have fallen into a habit of regarding particular words with disfavour which in England are used without offence to *express* disfavour, Englishmen are to be called coarse and offensive for using those words as of yore? Before he thus rebukes Englishmen, he should consider the case of his own countrymen, who have taken into favour and use freely certain words which in England have been from time immemorial regarded as improper. [I am simply unable to mention these words, because they are never used in polite society.] I take no exception to their being used in America, where they have no unpleasant significance; but it is simply absurd for one who uses these words freely, and hears the women of his family use them without offence, to be angry with Englishmen for using in their customary significance words which are not offensive to English ears.

Obviously the great fault of English manners with Americans of Mr. Higginson's kind is what is regarded as our thick-skinnedness. In reality an Englishman, though he does not wince or flinch when an American of the ruder sort tries to goad him to anger, feels the blow as keenly as the most sensitive American. But our whole system of training teaches us to take such blows as if we felt them not, repaying them though in due time, and with a serenity which suggests the mistaken notion that the return blow has not been provoked.† In ninety-nine cases out of a hundred, when one hears of British arrogance, he may infer that it has been roused by non-British insolence.

* "Oh, your niceties; I know what they are," said Felix. "They all go on your system of make-believe. 'Rottenness' may suggest what is unpleasant, so you'd better say 'sugar-plums,' or something else such a long way off the fact that nobody is obliged to think of it. Those are your roundabout euphuisms that dress up swindling till it looks as well as honesty." Men like Mr. Higginson would make English readers believe that all Americans are nastily minded. This, however, would be unfair in the extreme.

† In October 1873 I landed at New York for a few hours (our ship having arrived late) with three fellow-passengers and one of the officers. At the Fifth Avenue Hotel we were looking round the large hall in front of the office bureau, crowded as usual with Americans of all classes, from the loafer to the business man. We were soon recognised as Englishmen ("blarsted Britishers," as the polite American expression puts it), and a group of some twenty Americans, any one of whom would have been grievously offended if he had not been regarded as a gentleman, thought the opportunity a good one to divert the profuseness of their blasphemy from things in general to things British, abusing above all the Royal Family and especially the Queen, as a sure way of testing the thick-skinnedness of the Britishers. Our serenity was not disturbed by the cads, who seemed more moved by our silent contempt than they would have been had we met their rowdy ways by rowdy action. Now it so happened that the very next day two of the rowdies presented themselves to me—*more Americano*—on business. I do not know whether they recognised me, as I did them. Anyhow, they did not allow the occasion to pass without asking me how I liked America. When I replied that I had been too short a time ashore to form an opinion, but that it seemed to me the lower classes swore abominably and were exceedingly ill-mannered, they both had grace enough to turn very red with wrath. I am satisfied, however, they described my comments afterwards as due to sheer British arrogance, not to contempt and natural indignation at their conduct overnight.

## SCIENCE SHAMED BY GREED OF GAIN.

ENGLISH science has had to be ashamed occasionally of the ways of the scientific mendicant, who, in the course of what he calls the Physical Endowment of Research, has made vain promises and idle boasts, till Science has blushed for the ways of those who use her name for their own purposes. Science does not require her servants to be wageless. As the exponent of religion is not thought to shame religion by holding that the labourer, even in religious fields, is worthy of his hire, so is it with those who, working faithfully in the cause of Science, deem themselves entitled to just wages for their work, without which indeed they might be obliged to turn for maintenance from the work for which they are fit to law, medicine, religion, or commerce. But Science requires that there shall be no false pretences. The work done must be done zealously, and must be worth the wages claimed. Promises which the student of Science knows to be vain—such, for example, as in old times the promise to read or rule the stars, or in our own days to predict the world's weather from sunspots—Science "cannot away with"; and whether the wages asked for worthless work be high or low, the pittance of a country curate or such splendid incomes as our clamourers for endowment have suggested as appropriate, Science regards all such claims as discreditable if not dishonest.

But it would seem that there are deeper depths than any which Science had yet known. None of the advocates of physical endowment have yet, so far as we know, actually claimed money for making suggestions. None of them have claimed a price for time given to the discussion of one of their physical observatories, even when such time has been their own; and I should trust that even the most barefaced among the mendicants of Science would not think of asking such a price for time *not* his own so used, time taken from work in some well-salaried office.

This achievement was reserved for an American scientist. Mr. E. S. Holden, the same man who selected the respectable columns of the *Atlantic Monthly* to make false and libellous personal charges against me, who abused me for being led by the success of my first work, "Saturn and its System" (a dismal failure commercially), to endeavour to get money for literary work, as if that were dishonest, and showed the nature of his purpose by blindly vituperating, as if he had read it, a book of mine which was not published till fourteen years later, this man—so zealous for purity of purpose in scientific work, that he denounced honest work because, as he supposed, it had been successful—has just done that which I venture to predict will stand out in the records of science as the most discreditable act of which any man of science has yet been guilty.

During the last twelve years, Mr. Holden has written certain letters conveying suggestions in regard to the Lick Observatory, which (most unfortunately for science) has been placed in his charge instead of being entrusted to one of the many skilful observers America possesses. He has also made some few journeys of inspection, the expenses of which have in all cases been paid. The time thus employed has in reality belonged to others, since he has all the while held highly salaried office, and latterly has been president of the State University of California, to which the Lick Observatory has been presented.

In the meantime a host of better men, men who know what telescopic work really is, have been ready with valuable advice and assistance. I suppose what Mr. Burnham, for example, has done in this way outvalues fifty-fold anything which has been suggested by the man who at

Washington could do nothing of the least worth with the 26-inch telescope, nothing original at all—except the discovery of an impossible third satellite of Mars, which would make old Kepler turn in his grave if only astronomers would accept it. (They are about as likely to do so as to believe in a total eclipse of a half-full moon.) Every American astronomer worthy the name has been interested in the great telescope, and delighted to do anything in the way of suggestion or assistance to develop its chances of success.

But the Trustees of the Lick Observatory have had a sudden surprise, which might make them unwilling to accept in future the assistance or advice of students of science were they not able to form a tolerably clear idea of the exceptional nature of the man they have to deal with. Mr. Holden has sent in a claim for six thousand dollars for his advice—"services rendered" he puts it. As the Trustees justly point out, if all the rest of those who have helped valued their services at the same rate, the Trust would be bankrupt. They therefore disallow his claim, setting aside 10,000 dollars (from the sum they were preparing to hand over to the University of California) to meet the possible expenses of legally resisting Mr. Holden's suit.

The Trustees of the Lick Observatory believe that Mr. Holden will withdraw his claim. And very likely he will—if his legal advisers tell him he has no chance of getting the money. But whether he withdraw it or not, he can never remove the disgrace which his claim has brought upon science; for a position has been given to him in the world of science—not by any scientific work which he has done (for he has done none of any value), but by the mistake which learned bodies, in England as well as elsewhere, have made in conferring distinctions on him which in some cases they declined to bestow on fellow-countrymen of his (the late Dr. Henry Draper, for example) incomparably his superiors. I repent me that I did not, when, I fear, it was my duty to be outspoken, prevent, as I could most surely have done, his election to the foreign associateship of the Royal Astronomical Society, a body which must now in some degree share the disgrace which Mr. Holden's claim has brought upon all scientific bodies with which his name can in any way be associated.

## THE EARTH'S UNRECORDED PAST.

REGARDING our earth as a member of the solar system—the chief member of that set of so-called terrestrial planets which form the sun's special family—the astronomer studies her with special interest as the one planet which can be thoroughly examined. The work of the geologist becomes on this account especially important to the student of astronomy. He does not require, indeed, to have that detailed knowledge of geological matters which is essential to the student of geology; but, on the other hand, he requires a much fuller and at the same time more exact knowledge of geology than many imagine. He should have, in fact, the same sort of knowledge of geology that Humboldt had of astronomy—a knowledge sufficient to enable him to weigh and appreciate the theories as well as the facts of a science which, though outside his special domain, so closely adjoins it, that without such knowledge the study even of that special domain of his must be imperfect. Fortunately the exact study of one department of science, though it cannot help in itself to enable any one to come to sound conclusions in regard to another, yet surely protects him against the risk of forming unsound or paradoxical theories, for he knows from the study of his own science what is essential to the formation of just opinions in another. Hence the student of astronomy sees that he must study the results of the labours and researches of geologists thoroughly, though generally. He has to take only a bird's-eye view of geology, but the view must be taken from a proper standpoint, so that no illusions may affect its general accuracy, and, moreover, the survey must be complete, not partial.

Let us see how the astronomer is led to study the geology of the earth.

We recognise our earth as having in the beginning of her career passed through that sunlike state whose general conditions we can study in the sun. Doubtless there were important differences of detail, due chiefly to the immense inferiority of the earth in point of size and mass, just as there are important differences between the first stages of an oak's life and the first stages of the life of a fuchsia, between the beginnings of the life of a fly or a bee and those of the life of a lion or an elephant. Still, in all its more general characteristics the conditions of our earth in the earliest stages of her existence as a separate orb were the characteristics of a sun. The greater portion of her mass must then have been in the vaporous state, even the stubborn metals adding their vapours to the complex atmosphere which, in reality, formed then the largest portion alike of her mass and of her volume. Movements akin to those which are taking place all the time in the sun, as well as disturbances akin to those which from time to time alter the aspect of his photosphere, must have taken place in the earth when she was in the sunlike stage of her career.

Later, after millions of years indeed, for it is by such periods we must measure the lifetime of a world like our earth, large portions of the matter which had been vaporous became liquid, and eventually solid. It would be more correct, however, to say that as time progressed a larger and larger proportion of the materials forming the earth's mass became liquid, and a larger and ever-growing proportion solid. For just as even at this day not a single drop of the waters of the sea is permanently liquid, not a cubic inch of the polar glacial masses permanently solid, so must it have been in the earlier stages of the earth's career with the molten materials formed by cooling from gaseous matter, and with much, at any rate, of the solid materials formed by cooling from molten matter. There must have been continual interchange of condition between the solid, liquid, and vaporous states in the case of nearly all the elements and compounds at first, and of the greater number of the elements, until a great advance had been made—which must have required many millions of years—to the state of matters existing now, when oxygen and nitrogen are the only elements free in cosmically large amount, and water the only compound substance which is free to assume in large quantities the vaporous and solid states, in addition to its customarily liquid condition.

The progress of the earth through the second important career of her life as an independent orb was doubtless characterised by a steady diminution on the whole of the proportion of vaporous matter in her mass as compared with liquid and solid matter, and of liquid as compared with solid matter. There must also have been a steady diminution in the number of substances present in large quantities *anywhere* in the vaporous form. In an early part of this stage of the earth's career the metals and metalloids would for the most part either solidify or enter into such chemical combinations as would make them parts of solid bodies. More and more of the surface of the forming earth would thus become solid, though doubtless there was very little perma-

nence in the solid crust formed in various parts of the earth in this stage of her career. Immense tracts of liquid surface would solidify through some relatively slight changes of temperature or other conditions; but the crust thus formed would be fissured from time to time by the seething liquid masses beneath; and often large regions of fiery hot crust would be converted suddenly into the liquid condition through the action of currents of hotter matter rising underneath them. Or, as large fields of ice are carried now by oceanic currents into regions where they are melted by the warmer waters around them, so in those earlier days of the earth would immense tracts of glowing crust be carried to regions where they would melt in the fervour of the hotter liquid beneath them, and resume the liquid condition out of which they had for a time passed.

Among the substances now mostly liquid which must have been almost wholly vaporous throughout the second stage of the earth's orb-life, water of course must be regarded as the most important. Water could not have rested, in the liquid state, on the intensely hot surface of our earth in this part of her life. It is true that the atmosphere must have been far more dense then than now, because it must have included immense quantities of gaseous and vaporous matter not now present in it except in very small amount: and under such an atmosphere water might be heated till it shone with its own inherent light, without being converted into steam. But the temperature of the crust must have been greater even than this would imply. And though a few lakes and pools of red hot water may have gathered from time to time on the ever moving white hot crust of the earth, yet far the larger portion of the water must have been vaporised, forming a vast atmosphere of steam, which close by the earth's glowing surface would be self-luminous. At considerable heights above that surface the steam would condense in the form of visible clouds, not self-luminous, but lit up on their inner side by the fiery surface of the crust beneath. Probably several layers of clouds would form at different heights. The lowermost layer would give off vapour from its upper side, to rise to a greater height, and form by fresh condensation another layer, only illuminated by such light from the crust as passed between the clouds of the lowest layer. And the process would probably be repeated in such sort that several layers would be formed enclosing the earth's real globe at different distances from its glowing surface. What the depth of the complex atmosphere of the earth in that stage of her career may have been, it is not easy to determine. For what we know of the sun and (less certainly but still clearly enough) of the giant planets, shows that the laws of the gaseous pressure and density prevailing within such limits as bound the experiments of our physicists, do not hold at the high temperatures and tremendous pressures existing certainly in the sun and giant planets, and almost as certainly in our earth's dense atmosphere when she was in the first two stages of her planet life. To show that this is so, it is only necessary to note that, whereas terrestrial experiments have taught that there is a critical temperature for each gas, at higher temperature than which no amount of pressure will produce liquefaction, were this true of the sun, not only would every particle of his substance be vaporous, but density increasing with pressure in gases and vapours (except where liquefaction is approaching, which is not here the case), the compression would be so great even a few thousand miles below the visible limits of his atmosphere that the density even of hydrogen would be greater many times than that of platinum, the heaviest element known on earth. We not only know that this is impossible, but that the mean density of the sun, instead of being thus enormous, is only about a fourth of the mean density of the earth. We can infer from this that under the conditions existing when our earth was in the sun-like and fiery stages of her career, an atmosphere of great extent, with probably many successive layers of cloud, surrounded her fiery globe, whose partly liquid partly solid surface, though glowing with a white heat, probably could pour no portion of its light through the enwrapping cloud-masses.

We may also confidently infer that in the earth's deep atmosphere in this earlier stage of her life, vertical movements of great energy took place, as immense volumes of compressed vapours (not steam alone) were flung upwards with tremendous energy in volcanic explosions, or as cloud masses in which whole seas of water were contained gave birth to cataracts (rather than torrents) of intensely hot water, strongly charged with destructive acids. We may have to look to other planets for evidence that such vertical displacements do actually take place during the earlier stages of world life. Yet, reasoning on what our earth's condition must have been at such stages in her life, or on what it would now be if she were placed as in some vast crucible and heated throughout her whole frame till her crust shone white again, we see that vertical movements of both kinds, eruptional or upwards and torrential or downwards, cannot but have been constantly in progress throughout her deep, complex, and cloud-laden atmosphere. Such movements, by altering the distance of the moving masses from the axis of rotation, would cause either a lagging or a relative advance of these masses amongst those into which they were ascending or descending respectively—in other words, bands or zones of vaporous or cloudlike nature, akin to the zones of Jupiter and Saturn, formed in the deep and complex atmosphere of the earth at that stage of her orb-life.

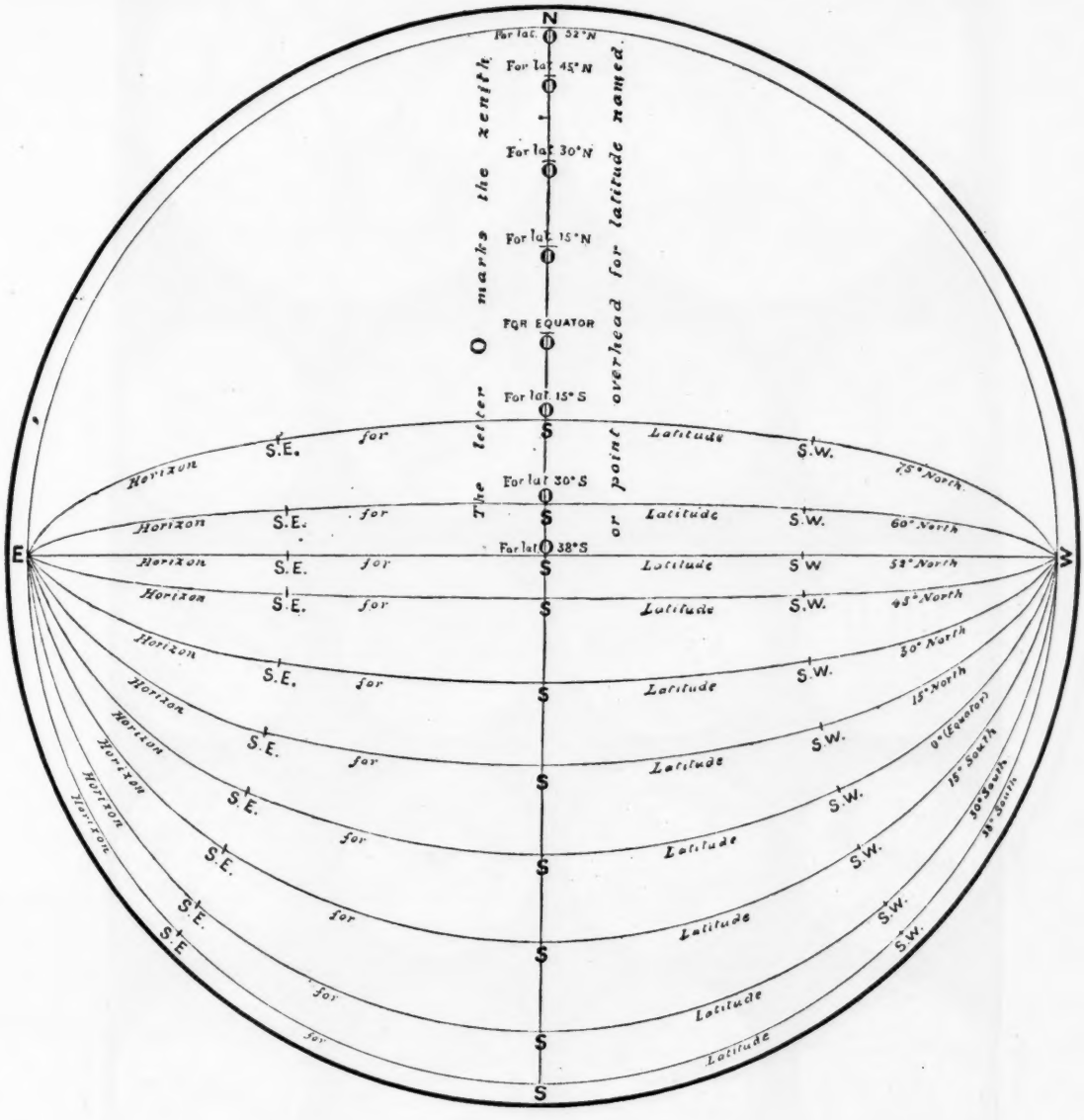
After millions more of years the earth became ready to enter on that part of her existence which may be called her life-bearing career. Not everywhere on her surface at once, but in certain regions—possibly the polar portions—where the cooling was first sufficient, certain lower forms of life, scarcely distinguishable then as vegetable and animal, would be possible. Apparently the conditions which rendered them possible were also such as to bring about their generation—we know not how, and still less do we know why. Multitudinous germs of life, not necessarily multitudinous in form, possibly including but a few forms, possibly but a single form, must have appeared on the earth in a very early portion of the present stage of her life—millions of years probably before the era to which geologists attribute the Archæan or most ancient rocks of the earth (preceding those called primary by geologists), for from such germs alone could the forms of life which we recognise in the fossils of the lowest of the primary rocks have been developed. So much we are assured of; but as to the manner in which such germs of life came into existence, and the way in which the property we call vitality came to belong to them, we know no more than we do of the manner in which the materials of which suns and planets have been formed came first to be, or of the way in which those materials came to have the specific properties which we know they possess.

It is not even from the stage thus reached, remote in the past as it must be, that we can trace the earth's record. Millions of years must have passed before the simple primordial forms of life, animal and vegetable, had developed (along certain lines) into the specialised and often highly complex forms found in the lowest of the geological strata. Of the interval we have scarcely even any records in the material changes which took place as the Archæan rocks were forming. It is scarcely to be hoped that any traces of life of that ante-primary era will ever be discovered, so unfavourable were all the conditions for the preservation of animal or vegetable remains.

## KEY MAP TO THE SOUTHERN SKIES.

THE accompanying map is intended for the use of those who possess the series of twelve Southern Maps which were completed in KNOWLEDGE for January last. If a tracing were made on sufficiently transparent paper, this tracing placed over any one of those maps would serve to indicate where the southern horizon, with the several points E., S.E., S., S.W., and W., falls for the latitudes named. But a better plan is for the observer in any of the latitudes mentioned to cut out a piece of paper in the form of an arc, the upper edge of which corresponds to the pictured arc for that latitude. Then having marked the above-named cardinal points along it, he can bring the east and west ends of the arc to coincidence with the points E. and W. on proper map for the date and hour of observation. The stars seen in the chart along and above that arc will then be the stars above the horizon from east through south to west at the observer's station.

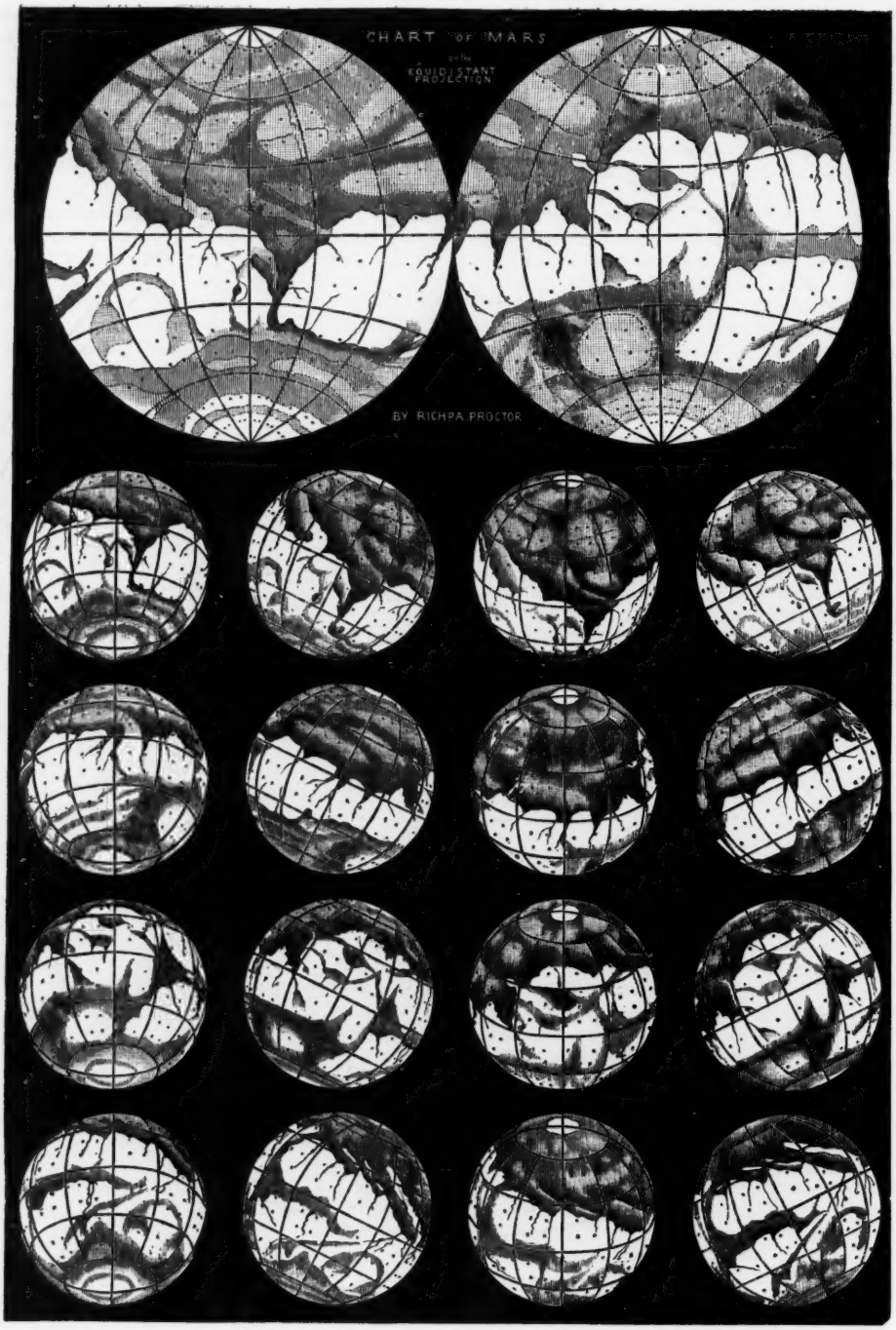
Thus will the maps serve to show the stars over far the greater part of the heavens visible from northern latitudes, and all the stars visible in southern latitudes from the equator to the most southerly inhabited regions.



## MAPS AND VIEWS OF MARS.

I GIVE this month the long-promised map of Mars, accompanied by what may be called a picture map, and by a series of projections showing Mars not as actually seen on any special occasion, but as he would appear if my maps are correct, the air of Mars free from clouds, and observing conditions favourable; only I have included meridians and latitude-parallels which have not yet, I presume, been marked by Martian races on the surface of their world, though so to mark them would be child's play compared with the construction of those double canals in which Signor Schiaparelli and M. Perrotin believe.

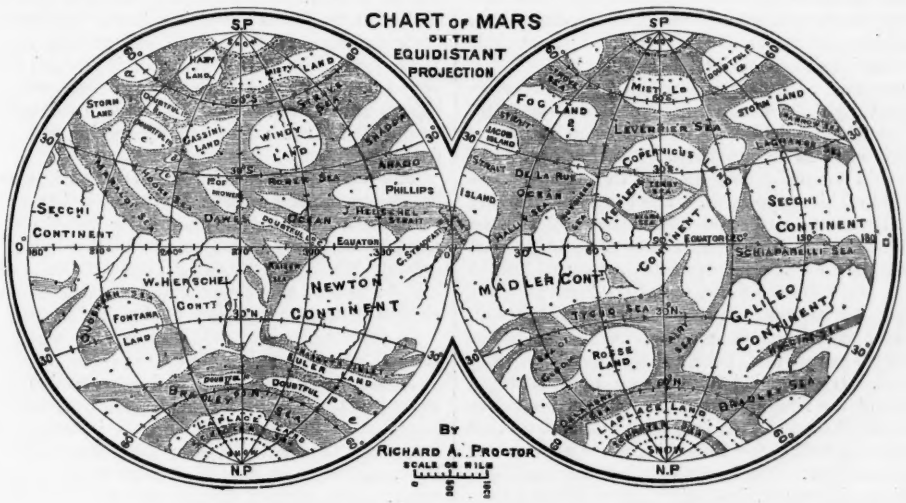
The maps and projections require no explanation. The history of the researches which have led to the determination of the various features of the planet will be found in part viii. of my "Old and New Astronomy," to be published on November 1.




MIDSUMMER (Southern). VERNAL EQUINOX (Southern). MIDWINTER (Southern). AUTUMNAL EQUINOX (Southern).

I may remark, however, with regard to the names which I have used for indicating continents and seas, that while in the main I have followed the nomenclature adopted in my former chart as corrected in that respect by Mr. Green, I have not adopted all his changes, and I have introduced some changes of my own. I never intended my first nomenclature to be definite; indeed, I adopted it merely for convenience of reference in a work of my own on the planet—planned like my "Saturn and its System," but not accepted by publishers as likely to be commercially successful, so that "my poverty but not my will" forced me to withdraw it from an unappreciative community. Mr. Green was quite right in pointing out that some names were used too often—Mr. Dawes's name, for instance, was given to a Continent, an Ocean, a Sea, an Island, a Bay, and so forth. That was all very well for my plan, but not in a chart for general reference. Mr. Green altered and added freely; somewhat too freely, indeed, doing what has always seemed to me undesirable, in crowding in a number of names of living persons (my own included), after a fashion recalling Mr. Birt's preposterous additions to the names of lunar craters. In omitting many of these I have taken the opportunity to substitute unobjectionable names (which may be regarded as only temporary) for some of those which had been unsatisfactorily named in my former chart. Mist Island, Windy Land, Cloud Land, Cape Steadfast, Gloomy Sea, and the like, are names which, while altogether free from objection in themselves, correspond with the actual appearance of the features named.

Of Signor Schiaparelli's classical nomenclature I can only say that, judging from what one hears when papers are read or discussed at the rooms of the Astronomical Society, there are not nine of Schiaparelli's names out of ten which would be properly pronounced, even if observers and astronomers generally could be expected to fix in their memories a series of sesquipedalian and, for the most part, entirely unmeaning names. The nomenclature belongs to the affectations by which men of science, who ought to have known better, have brought ridicule on science and on themselves. *Machina Pneumatica* for a constellation, *Margaritifer Sinus* for a Martian feature, *Chromosphere* and *Leucosphere* for solar appendages, and all such absurdities, should have no existence among sensible students of science.




## MANX AND WELSH FAIRIES.

BY STELLA OCCIDENS. (MARY PROCTOR.)

> In oldè dayès of the King Artoûr
> Of which the Breton spoke great honoûr,
> All was this lond fulfilled of faërie;
> The elf-queene with her jolie companie
> Danced full oft in meny a grené mede.—CHAUCER.

THE fairy folk-lore of the Isle of Man, which was early peopled by the Celts, is very like that of England. Their fairies are called Good People, though they scarcely deserve this name, since from all accounts they are the most mischievous imps in existence. They steal little children out of their cradles, leaving ugly changelings in their place, and are also very fond of taking midnight rides on stolen steeds, which the owners find in the stable next morning covered with foam and sweat, and nearly tired to death.

The Phynnodderee, or Hairy One, of Man, is like the Brownie or Kobold, and his story is a sad one. When he should have been in attendance at the Fairy Court on the occasion of the *Re-hollys vooar yn ouyr*, or harvest moon, he was dancing in the merry glen of Rushen with a pretty Manx maiden. For this grave offence he was banished from Fairyland and doomed to wander about the Isle of Man till Doomsday, in a wild form, covered with long shaggy hair. He is a good-natured spirit, often helping farmers to cut hay or drive cattle home before a storm. On one occasion he carried some huge blocks of stone from the beach to a place near the foot of Snafield Mountain, and the owner rewarded him by leaving a whole suit of clothes in one of his favourite haunts. The Phynnodderee, on finding them, lifted them one by one, singing dolefully meanwhile:—

"If these be all thine, thine cannot be the merry glen of Rushen," and, giving a melancholy wail, he disappeared and has never been seen since. The old Manx folks say "there has not been a merry world since he lost his ground."

An account given of a fairy banquet in Man recalls the well-known legend of the "Luck of Edenhall." It is related that a farmer was returning home across the fields one evening, when he heard sounds of music in the dis-

tance. Presently he came to a band of little folks who were feasting merrily, and who persuaded the farmer to join them. He did so, and was much surprised when a little man plucked him by the sleeve, and warned him not to taste anything that was placed before him. "For if you do," said the little man, "you will be as I am, and return no more to your family." The farmer followed his advice, and when a silver goblet was handed to him, he spilled the contents on the ground. At daybreak the music ceased, and the fairies vanished, leaving the farmer with the silver goblet in his hand. He returned home, feeling very tired, and next day he went to the parish priest for advice with regard to the silver goblet. The latter told him that he had better give it to the church, and it is still to be seen in Kirk Merlugh.

Fairies and hobgoblins are firmly believed in still by the peasantry in the southern counties of Glamorgan, Carmarthen, and Pembroke. The fairies are called y Dynon Bach Teg, i.e. *The Little Fair People*. The bells of the foxglove are called elves-gloves, and the mushroom, elves-food. These little beings are supposed to be the souls of the ancient Druids, who were not quite good enough to go to heaven, nor bad enough to go to the other place; so they are allowed to wander about till the Day of Judgment, when they will join the ranks of the elect, and "read their title clear to mansions in the skies."

They are very fond of music and dancing, especially on bright moonlight nights. A story is told about two farm-servants, called Rhys and Llewellyn, who were returning home from their work in the twilight. Hearing strains of music, Rhys could not resist dancing, and in a moment had danced far ahead of his companion. The latter, on arriving home without Rhys, was suspected of murder, and thrown into prison. Luckily, a farmer who was well acquainted with fairy-lore, believed Llewellyn's story, and told him to lead him to the place where he had heard the music. They came to the spot, which was "green as mountain-ash," and, as Llewellyn stepped within the magic-circle, he heard the most enchanting strains, and beheld Rhys amid a merry band of dancers. His friends had to use all their strength to pull him out of the ring and force him to return home. He was not at all pleased at their interference, insisting that he had only been dancing for five minutes, and was not ready to go home yet. He became melancholy mad, and died a short time afterwards, it is said; and the next morning one of the villagers, who passed near the fairy-circle, "found the edge of the ring quite red, as if trodden down," and the marks of little heels the size of a thumbnail.

These fairies are fond of hunting, and have been seen riding on little white horses no bigger than dogs, whilst the sound of a bugle-horn and the huntsman's halloo could be plainly heard. A man who was crossing over Bedwellty Mountains one night heard sounds of music, and in a moment was surrounded by fairies. Having heard that they will disappear at the sight of cold steel, the man drew out a knife and they instantly vanished. In the same way fairies who have married mortals have been known to disappear on being touched with iron. A man who had married a fairy tossed a bridle to his bride, and, the bit touching her, she flew through the air at once, and plunged headlong into Corwrion Lake.

A similar legend is told about a most romantic spot among the mountains of Carmarthen. It is called "The Van Pools," and is said to be haunted by "the spirit of the Van." She appears at midnight on New Year's Eve, and is said to be "dressed in a white robe, bound by a golden girdle. Her hair is long and golden, her face is pale and melancholy; she sits in a golden boat, and manages a golden oar." She had married a farmer on condition that he should never know her name, or strike her, especially with iron, for he would then lose her for ever. After a little while he forgot his promise, and on two occasions, when she had vexed him, he struck her. The third time they were ploughing together, he guiding the plough and she driving the horses. The horses going wrong, the farmer threw something at them which hit his wife, and in a moment she disappeared beneath the waters of the Lake Van Pool.

A man who wished to see the fairies made an appointment with an old gipsy to meet her by moonlight on the top of Craig y Dinis. She washed his eyes with a wonderful lotion, helping him to see thousands of little beings all dressed in white, and dancing to the sound of harps.

"They then placed themselves on the edge of the hill, and, sitting down and putting their hands round their knees, they tumbled down one after another, rolling head over heels, till they disappeared in the valley." For some time the sound of their harps could be heard, gradually dying away in the distance.

A mischievous little being called Pwcca, resembling our English Puck, used to haunt Wales; and in Brecon there is a spot called Cwm Pwcca, or Puck's Glen, where he is still to be seen.

A man who was returning home late one night saw a little wee man a few yards ahead of him carrying a light. He followed him, and Pwcca (for it was he) led him to the very edge of the precipice Cwm Pwcca, when, holding the light high above his head, he gave an impish laugh and vanished in the valley below, leaving the man in utter darkness.

The Welsh fairies are like the Irish with regard to stealing babies out of their cradles, leaving ugly little changelings in their place. In Brittany a similar belief prevails. There was constant intercourse at one time between the inhabitants of Wales and those of Lesser Britain, as it was then called; in fact, the Bretons and British were of one blood, so that their fairy folk-lore is almost the same.

In Glamorganshire a legend is told which is not unlike the following related in Brittany:—

A mother whose child had been stolen by the fairies prayed to the Virgin for help. She was advised to "prepare a meal for ten farm-servants in an egg-shell," which will make the Korrid speak; she is then to whip him till he cries, and when he does his mother will come and take him away. The mother did as she was told, and when the changeling saw the strange meal prepared he exclaimed: "I have seen the egg before I saw the white hen; I have seen the acorn before I saw the tree; I have seen the oak in the wood of Brézal, but never saw I such a thing as this." "Thou hast seen too many things, my son," replied the mother, and she began to whip him, when his mother came to her crying: "Do not beat him, give him back to me; I have not done yours any injury. He is king in his own country." When the mother went home she was rejoiced at finding her own child asleep in the cradle.

The Breton fairies are divided into two classes—the Fays or Korrigans, and the Dwarfs or Korreds. The Korrigans are beings two feet high, with long flowing hair, which they are always combing carefully. They wind a long white veil around their bodies, and at night their beauty is ravishing; but in the daytime their eyes appear red, their hair white, and their faces wrinkled [even such tales have been told of some ladies of the *corps de ballet*]. The Korrigans, though fond of music, do not care much about dancing. Once a year, on the first of May, they have a great feast, during which a crystal goblet is passed around, and those who drink the magic potion it contains become all-wise and can foretell the future.

The Korrigan is like the Elle-maid of Scandinavia, and

in the same way the Korreds resemble the Trolds. They are short and stumpy, with shaggy hair, small deeply-set eyes, and wrinkled faces. Their voices are thin and cracked, their hands like a cat's paws, and their feet are horny like a goat's. They are spiteful and vicious. They are very fond of dancing, but woe to the belated shepherd who comes across them during their midnight revels! They dance around the *dolmen* (stone-tables, also called by this name in Devon and Cornwall), and any one who is forced to join in their roundel must keep it up till cockcrow. The poor victim "is mercilessly whirled about till he falls down breathless and exhausted, amidst the peals of laughter of the dwarfs, who all vanish at break of day." *

Breton folk-songs tell us of underground passages called querlich's holes or Korred's grottoes, where great treasures are kept. Sometimes the dwarfs take them from one place to another; and if any one passes by at the time they are allowed to take a handful, but no more. Should a rash mortal venture to fill his pockets the money vanishes, and he "is assailed by boxes on the ear from invisible hands."

A Breton farmer thought he would try his luck; and one moonlight night, when the dwarfs were absent on a gay frolic, he stole some treasure out of a Korred's hole. He hastened home, and hid it under some tiles in the kitchen floor, afterwards covering the whole place with burnt ashes and embers.

About midnight the farmer heard the little imps creeping in stealthily through a hole in the wall. But what a howling and lamentation they set up when they trod on the burning embers. The farmer chuckled to himself at their discomfiture, but his mirth was soon changed to consternation when they revenged themselves by smashing every piece of crockery he possessed. At daybreak they all vanished, saying, "In Iannik-ann-Trevon's house we burnt our horny feet; but we made a fine mess of his crockery." †

## NORTH ATLANTIC ICEBERGS.‡

ICEBERGS are a great source of danger to Transatlantic navigation from March to August every year. This is the season in which the expected proximity of these dread masses of ice demands from the mariner an increased vigilance. Sometimes, but very seldom, bergs have been fallen in with much earlier. On New Year's Day, 1844, a berg was passed by the *Sully* in 45 N. 48 W., and this year, on January 3, one was reported in almost the same position. The northern ice barrier is broken up by the increasing power of the sun's rays as he travels northward along the ecliptic. Fields of ice, sometimes having an area of one hundred square miles, are detached, and a free exit afforded for the imprisoned icebergs. Icebergs and field ice are borne to the southward by the cold current that follows the bend of the land from Labrador to Florida. Field ice is formed on the sea surface during the Arctic winter, but bergs have their origin far inland, and are the growth of years. Greenland glaciers glide gradually down their gentle slopes into the sea, and the upward pressure of the water breaks off their snouts to form the icebergs of the North Atlantic. Some hardy Norwegians are about to cross Greenland, and intend to make a special study of the movement of the coast glaciers and this setting afloat of bergs. Ancient glaciers have written their story on the mountains of Great Britain, and bergs were formed a little way off the west coast of Ireland during the glacial epoch.

There exists a marked difference in form between the bergs of the two hemispheres. Arctic bergs are of irregular shape, with lofty pinnacles, cloud-capped towers, and glittering domes, whereas the southern bergs are flat-topped and solid-looking. The former reach the sea by narrow fiords, but the formation of the latter is more regular. It is well to give these splendid specimens of Nature's handwork a wide berth, for they frequently turn somersaults owing to the wasting away of their immersed portions. Immense pieces of ice fell from a berg on to the deck of a ship that had approached too close to it while in this transitory state, carrying away her masts and maiming some of the crew. Again, ships have been sunk by colliding with submerged portions of bergs, extending from their visible volume like reefs of rocks from a bold sea coast. Hayes compared one that he saw to the Colossus of Rhodes. His ship could have sailed under the arch of ice formed in the heart of the berg.

North Atlantic bergs are neither so large nor so numerous as those met with in the Southern Ocean, between the Falkland Islands and the Cape of Good Hope. In 1854–55 an enormous ice island was drifting in about 42 S. 24 W., for several months, and was passed by many ships. It was 300 feet high, 60 miles long, and 40 miles wide, and was in shape like a horseshoe. Its two sides enclosed a sheltered bay measuring 40 miles across! A large emigrant ship, the *Guiding Star*, sailed into this icy bay and was lost with all hands. A similar but smaller mass of ice was met with in the North Atlantic by the *Agra*. She ran into a bay formed in the centre of an iceberg, in 42 N., which was 1½ mile across, and she experienced great difficulty in beating out again.

A cubic foot of ice weighs about 930 ounces, but the same volume of sea water weighs 1,280 ounces. Hence ice floats on water, and but one-ninth of the volume of a berg is exposed to view. There are several well-authenticated instances of bergs one thousand feet high having been sighted in the Southern Ocean, so that this would give the total height of them as about nine thousand feet!—a fairly good-sized mass of solid water. In May last year the *Inchgreen* passed close alongside of a berg that Captain Miller estimated had an altitude of seven hundred feet above the sea surface and was seven miles long. Bergs have often been seen grounded on the banks of Newfoundland, where the deep-sea lead gave a depth of 650 feet. Ross saw several stranded in Baffin's Bay, where the depth was 1,400 feet.

Bergs are unusually numerous in some years, and a connection is said to have been traced between the frequency of bergs in the North Atlantic and the low temperature in our islands during the summers of some years. The ship *Swanton* passed three hundred bergs in 1842 in 43 N. 50 W. She narrowly escaped destruction during the night, as she passed between two huge bergs that almost grazed her sides. Captain (afterwards Rev. Dr.) Scoresby, while whaling in the northern icy sea, counted no less than five hundred bergs under way for the open waters of the Atlantic. Last June the steamship *Concordia* passed seventy-eight large bergs in a short space of time, as they lay aground in the Straits of Belleisle. This year the ice is both late and scarce; in 1883 it was very abundant. No forecast can be made as to the probability of frequency of bergs. A vessel has been so firmly fixed in the ice in the month of March in 44 N. 45 W. that her master was able to take a stroll on the ice. In 1841 several ships, stopped by ice in mid-

* Grimm, "Teutonic Mythology," p. 466. In Norse legends reappears the trick of engaging a Trold in conversation till the sun is risen; when he looks round and sees the sun he splits in two. The same occurs in the story of Rumpelstilzchen.

† Keightley's "Fairy Mythology."

‡ From the *Liverpool Journal of Commerce*.

Atlantic, availed themselves of the opportunity to kill some seals that were basking upon it.

Bergs have been seen in the North Atlantic laden with lumps of rock, sand, and soil. The banks of Newfoundland would appear to have been formed in this way. Arctic lands suffer denudation by the inland ice as it creeps along towards the sea, and the bergs, separated from their parent glaciers, deposit the fragments at the bottom of the old ocean, there to harden into rocks and help in moulding the surface of the coast. Nothing is lost, nothing is new. In August 1827 a berg was observed stranded in eighty-five fathoms in 46½ N. 45 W. Much earth and rock were embedded in its fissured sides. Polar bears and other Arctic animals were seen on the bergs of 1883. An abandoned ship was passed high and dry on a huge ice island in 1794, and a ship with her crew was seen similarly situated in 1845; but no help could be afforded. On April 21, 1851, the brig *Renovation* passed an immense ice island, about ninety miles to the eastward of St. John's, Newfoundland. Two dismantled ships lay snugly upon it, but there was no sign of life. Captain Ommanney, R.N., was deputed to investigate this report, and took great pains to arrive at its truth, as it was inferred that these ships were the *Erebus* and *Terror*, of Sir John Franklin's ill-fated expedition. Some people are still of the same way of thinking. The crew of the German discovery ship *Hansa* were compelled to abandon their vessel, crushed by ice, and took refuge on an immense floating mass of ice, where they remained for eight months. Their floating ice island was seven miles in circumference, and drifted south, until the poor fellows were able to make their escape. During this time they had lived in a hut constructed from the coal saved from their ship. H.M.S. *Resolute* was abandoned embedded in the ice, but was picked up after a long drift to the southward. This ice-bearing current tends to make the American coast very cold, and, as we write, Sydney, C.B., is not yet open to navigation, although it is 7 degrees further south than Liverpool. The warmer water of the Gulf Stream, on the other hand, enables the whalers to get far to the northward, on this side of the Atlantic, and makes the mean temperature of Ireland in 52 degrees N. as high as that of American coast ports in 38 degrees N., 14 degrees nearer to the equator.

Many losses and casualties were caused by the ice in the North Atlantic last season. Masters should take frequent observations of the temperature of the sea, although it must not be relied upon as a specific indication. Warning may often be obtained by means of the echo given off from a berg when a steam whistle is sounded. No precaution must be neglected by those who navigate our floating palaces and ocean tramps, but the safest plan is to adopt a southerly route clear of bergs. The *Etruria* has followed this course in her fastest passages. Our Admiralty charts show the seasonal limits of bergs, and the United States Hydrographical Office issues charts every month giving the exact position of each berg up to the moment of going to press. Notices of bergs passed at sea should be forwarded to Washington immediately on arrival, and every berg reported to us will receive due publicity in our columns.

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DOLLOND'S NEW (PATENTED) TABULATED DARK SLIDE.—This invention will be found of the greatest service to those who go scientifically into the details of the photographic art. The centre panel of each slide is made of specially prepared vulcanite, and is tabulated so that every particular may be at once written on it with lead pencil, thus doing away with the hitherto indispensable note-book. All details, such as the subject taken, time of exposure, stop employed, maker of dry plate, state of weather, &c., may be readily registered. This invention will, or should, entirely prevent the frequent mistake of exposing the same plate twice.

## EASY PROBLEMS IN THE DIFFERENTIAL CALCULUS.

IN KNOWLEDGE for July I suggested as easy exercises, to be dealt with by the differential calculus, and then geometrically to show the superior generality of the former method, these two:—

*To determine* (i.) *the cylinder of greatest volume; and* (ii.) *the cylinder of greatest surface, which can be enclosed in a given sphere.*

Let P Q R S be a cylinder enclosed within the sphere A C B D, M O K being the axis of the cylinder.

Let the angle P O B be taken as our variable, and put $<\text{P O B}=\theta$. The construction of the figure (omitting for the present the dotted lines) and its lettering needs no explanation. Then, if $r$ is the radius of the sphere,

$$\text{P L}=r\sin\theta;\ \text{O L}=r\cos\theta;\ \text{and}$$

(i.) Vol. of cylinder $\text{P R}=\pi r^2\cos^2\theta\,.\,2r\sin\theta$

$$=2\pi r^3\cos^2\theta\sin\theta,$$

and the differential coefficient of this expression with respect to $\theta$ gives us the equation

$$\cos^3\theta-2\cos\theta\sin^2\theta=0,$$

$$\text{or } \cos\theta=0;$$

$$\text{and } \cos^2\theta=2\sin^2\theta;\ \text{or } \cot\theta=\sqrt{2}.$$

Wherefore for a maximum O L should exceed P L, as $\sqrt{2}$ exceeds 1, or as a diagonal of a square exceeds a side [$\cos\theta=0$ obviously gives a minimum value].

(ii.) Area of cylinder P N,

$$=2\pi r^2\cos^2\theta+2\pi r\cos\theta\,.\,2r\sin\theta$$

$$=2\pi r^2(\cos^2\theta+2\cos\theta\sin\theta),$$

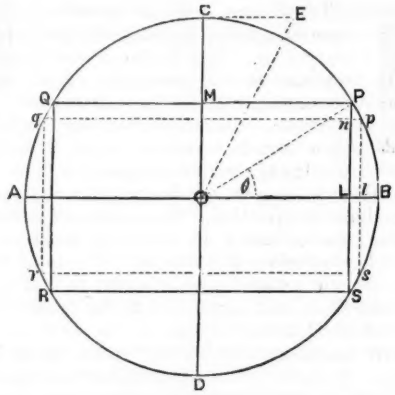
and for a maximum we must have

$$-2\cos\theta\sin\theta-2\sin^2\theta+2\cos^2\theta=0,$$

that is, $2\cos 2\theta=\sin 2\theta$; or $\tan 2\theta=0$.

So that if we draw the tangent $\text{C E}=\frac{1}{2}\text{O B}$, and join O E, O P must bisect the angle E O B.

To solve the same problems geometrically, complete the




dotted construction representing $p\,q\,r\,s$, a cylinder coaxial with P Q R S, and having very nearly the same dimensions.

Then, first, if P Q R S has the maximum volume, the increment and the decrement in passing to the cylinder $p\,q\,r\,s$ are ultimately equal. Hence

$$2\pi\,\text{O L}\,.\,\text{L}l\,.\,2n\text{L}=2\pi\,(\text{M P})^2\,.\,\text{P}n,$$

$$\text{or } 2\,\text{L}l\,.\,n\text{L}=\text{M P}\,.\,\text{P}n=\text{O L}\,.\,\text{P}n.$$

$$\therefore\ (\text{since } n\text{L}=\text{P L, ulty.}),\ \frac{2\,\text{P L}}{\text{O L}}=\frac{\text{P}n}{l\text{L}}=\frac{\text{P}n}{n\,p}=\frac{\text{O L}}{\text{P L}},$$

$$\text{or } \left(\frac{\text{O L}}{\text{P L}}\right)^2=2;\ \text{and O L}=\sqrt{2}\,\text{P L as before.}$$

The geometrical solution in this case is easy enough, as it chances. In the following case the geometrical solution is decidedly inferior to the analytical. For the area of the cylinder, equating the increment to the decrement, we have—

$2\times 2\pi\,.\,OL\,.\,np = 2\,.\,2\pi\,.\,2\,(PL\,.\,OL - p\,l\,.\,O\,l)$,

or $OL\,.\,np = 2\,[PL\,.\,OL - (PL - nP)\,(OL + L\,l)]$;

$= 2\,(nP\,.\,OL - PL\,.\,np)$; neglecting $nP\,.\,L\,l$, as ultimately evanescent compared with the other terms in the equation.

$$\therefore \frac{PL}{OL} = \frac{2nP - np}{2np} = \frac{2OL - PL}{2PL}$$

(by similar triangles $Ppn, OPL$) or $2(OL^2 - PL^2) = OL\,.\,PL$;

$$\text{whence, } 2\left(\frac{OL}{PL} - \frac{PL}{OL}\right) = 1,$$

$$\text{i.e., } 2\cot POL - 2\tan POL = 1;$$

whence $2\cos^2 POL - 2\sin^2 POL = \cos POL\,.\,\sin POL$, the same relation as by the other method, since $POL = \theta$, but obtained in a far less satisfactory manner.

The student will find it a useful exercise to deal next, first by the differential calculus, and next by geometry, with the following problems:—

*Determine the cone of maximum area* (i.) *without including base, and* (ii.) *including base, which can be enclosed within a given sphere.*

A correspondent in Bombay calls my attention to some supposed misprints in my "Easy Lessons in the Differential Calculus." One or two of these cases are real misprints, too easily to be detected, however, to require correcting, the rest are mistakes on my correspondent's part. He asks further this question:—It is stated on p. 14 that if we know the rate of increase of a quantity $s$ (as another, $t$, varies) to be a certain quantity $gt$, and also know this quantity $gt$ to be the differential coefficient of another quantity $\frac{gt^2}{2}$, with respect to $t$, we can at once write

$$s = gt^2 + \text{some constant.}$$

How, asks my correspondent, can this be regarded as obvious? The answer is that the differential coefficient of a quantity with respect to another has been already defined to be the rate of increase of the former as the latter varies. So that such a statement as my correspondent finds difficult is in reality akin to such a statement as the following:—If we know that the rate of increase of a certain property per annum is 250*l.*, and also know that the only portion of the property invested at 5 per cent. shows this annual increase to be the interest on 5,000*l.*, we can at once write

The property = 5,000*l.* + a constant portion bringing in no interest.

## Gossip.

By Richard A. Proctor.

Mr. T. Fraser is very anxious that I should deal with certain difficulties which have occurred to him in reading my "Old and New Astronomy;" and he is apparently not aware how fully the consideration of these difficulties will show the unlikelihood of his being able to deal with the overwhelmingly difficult problem of the cause of gravity, which he has made the subject of a pamphlet. I will endeavour to discuss matters for him.

* * *

First, he asks me how I can reconcile my statement in "Old and New Astronomy" that were the eccentricity of the earth's orbit to disappear she would move in a circle having a *diameter* equal to the *major axis* of the elliptic orbit, with my statement in Knowledge that "if the direction of a planet's motion when the planet is at its *mean distance* is right, it will travel in a circle having that mean distance for *radius*." Considering that the mean distance in an elliptic orbit is equal to half the major axis, while the radius of a circle is half the diameter, the two statements seem to me to be rather obviously identical.

* * *

In sec. 502, p. 215, the words "fig. 139" *are*, as Mr. Fraser points out, a misprint, rather obviously for "fig. 142." If an author, in his anxiety to be understood, adds new figures to make his original explanation more complete, it will occasionally happen that all the references to the figures whose numbers get altered will not be corrected. Still, no reader who is really interested can, in such cases, be for a moment misled; and every such reader will prefer full illustration to mere precision of references to illustrations manifestly insufficient. As the number of figures in "Old and New Astronomy," including plates, will run to over six hundred, the ingenuous and generously minded reader will perceive that there is more room for an occasional slip (not really disturbing the student's progress for a moment) than in works where the illustrations are counted only by tens or twenties. Mr. Fraser's supposition that H H′ in section 503 should be $h\,h'$ is mistaken.

* * *

Mr. Fraser objects to the use of the same letters, accented or unaccented, capital or small, in such cases, as they involve a strain on the memory, because you have to say "capital H," "small *h*," "accented H," "unaccented *h*," and so on—whereas he does "not know any argument by which the practice can be defended." "Excuse me, if I seem to lecture you," he proceeds (I very readily do), "but this has been on my mind for some time, and I feel better for the removal of the load." I apprehend he ought rather to say, "Do not smile if I seem to lecture you," for he is writing of a matter about which, as he practically admits, he knows nothing; whereas I have had occasion to study it carefully. The argument by which the practice is defended is that these repeated letters always represent associated things. Thus the mathematician calls the two ends of the major axis of an ellipse A and *a*, or A and A′; the two ends of the minor axis B and *b*, or B and B′; the two foci S and S′ (if he sometimes writes H for one focus it is because, while S is the first letter for the sun, H is the first letter of Helios, the Greek name for the sun). No mathematician, I imagine, ever thinks of saying "capital H" and "small *h*;" at least I never trouble myself to make such changes in reading any one else's mathematical demonstrations; neither do I say "non-accented H" and "accented H," but simply "H" and "H dash." However, if Mr. Fraser's mind feels free of a load, what more can be desired?

* * *

"But now," continues Mr. Fraser, "I come to a matter which has been on my mind for a very long time, in fact ever since 1881." I promised to deal with the tides, and Mr. Fraser "is sorry to tell" me "that after reading a part," and a part only, of what I say in Part IV. of "Old and New Astronomy," he is "in as great a fog as ever." He "happens to have invented the centrifugal theory for himself," and so takes "a fatherly interest in it." Seven years ago he thought himself the first inventor of it. And "I always thought it an extraordinary coincidence," he proceeds, "that in the same number of Knowledge in which I expected some notice of it to be taken, appeared a review of Professor

Newcomb's book in which the same theory appeared. I seem to be wrong in more directions than one lately; but if those with knowledge" (with a small k) "do not distribute it to those without, how can the circulation of KNOWLEDGE" (with a very large K) "be maintained?" (Very neat, Mr. Fraser.)

* * *

The trouble is that both the fallacy and the correction are so exceedingly old that readers of KNOWLEDGE might justly complain if any considerable amount of space were given to it. The oldest edition of Lord Grimthorpe's "Astronomy without Mathematics," which I possess, is the fifth, dated 1874, and in that work the fallacy is presented and the proper correction pointed out. Doubtless in earlier editions the same matter (in substance) will be found; and as the paradoxists are always with us, I doubt not the matter will continue to be dealt with in later editions, or, as it were, indefinitely. Precisely the same fallacy is advanced with regard to the sun by Mr. W. Mattieu Williams, old Sol being pictured in "The Fuel of the Sun" as constantly stirred up by centrifugal forces, which have no existence, and in variations of such forces, which are purely mythical. That book came out in 1869. Mr. Henry Perigal, however, had been earlier yet caught by the mistake, in the moon's case, as had Bentley more than a century ago, so that Mr. Fraser in 1881 need only have been astonished at Newcomb's making the mistake, for the same reason that all mathematicians were astonished. (Professor Newcomb long since recognised the mistake he had made and corrected it like a man.)

* * *

I can only find space to state here that the earth's rotation round her axis results in equal centrifugal tendency all round, producing the earth's oblateness of figure, while her monthly revolution around the common centre of gravity of the earth and moon would by itself cause every particle of the earth to traverse an orbit of exactly the same size. (Combining with it the rotation, all whose effects have been accounted for, cannot affect this.) The centrifugal tendencies resulting from the movement of the several particles in these equal orbits are balanced by the moon's attraction, with only such differences as the old statical explanation of the tides indicates in the moon's action on parts of the earth at different distances from the moon. These differences are small, and taking them into account as balancing the lunar attractions is merely repeating in a disguised form the old-fashioned explanation, which is altogether correct so far as it goes, and has never needed to be displaced, only added to—precisely as an explanation of the reeling of a top, which began by saying that the slanted top is solicited by gravity to topple over, would not have to be displaced (since so far it is right), but extended in such sort as to explain why the top thus solicited by gravity does *not* fall over (while its rotation lasts). The other idea of a centrifugal force, as if the earth revolved round the centre of gravity of earth and moon with the parts farthest from that centre travelling round the wider paths, would correspond to a state of things in which tides thirty times higher than the actual tidal wave would sweep over all terrestrial shores—precisely as the motion Mr. H. Perigal imagined for the moon would have effects far beyond any actually taking place, and as the kind of centrifugal stirring up imagined by Mr. Williams would be many times more than sufficient for the stoking work which Mr. Williams wants it to do.

## Reviews.

*Nature's Hygiene.* By C. T. KINGZETT, F.I.C., F.C.S. Third Edition. (London: Baillière, Tindall, & Cox. 1888.)—Every one is now familiar with the type of advertisement which begins, "At the time of the exile of the Duc de Choiseul on account of the notorious Madame du Barry"; or, "Among the many witty sayings of Sydney Smith which have been recorded"; on reading which to learn what happened anent the mistress of Louis XV., or what the famous Canon of St. Paul's really did say, we suddenly find that we have been entrapped into the perusal of an invitation to rub our aching joints with St. Vitus's Vinegar, or to scrub ourselves, our sons and daughters, our menservants and maidservants, our cattle and the stranger that is within our gates, with Appel's Sapolica, and so on. Now Mr. Kingzett's book is modelled on this form of advertisement, and it says but little for our critical acumen that we had got something like half-way through the volume before making this discovery. We must do its author the justice, however, of admitting that the interest of his ostensible subject, and his manner of treating it, irresistibly carried us into the middle of what we may call the business part of his book before we detected this. In short, he winds up a most interesting account of the nature of malaria, of the germ and graft theories of disease, of the treatment of sewage, and of the general sanitary conditions indispensable to the preservation of health, with a puff pure and simple of "Sanitas," a disinfectant of his own invention produced by the oxidisation of turpentine. His work might be divided into two parts with advantage.

*Nature's Fairy-Land.* By H. W. S. WORSLEY-BENISON, F.L.S. (London: Elliot Stock. 1888.)—In a series of picturesque essays, Mr. Benison leads us through woodlands, over heaths, by hedge, copse, and stream, and takes us for a ramble on the seashore. In the course of our wanderings we are taught a good deal of botany, some physics (in the shape of a description of the formation of rain and of the action of waves), and have something of the manners and customs of fishes and molluscs, spiders and flies, explained to us. This pretty little book may well be put into the hands of young people in whom it is desired to create or foster a taste for an innocent and engrossing means of recreation. Some of Mr. Benison's teleological remarks might perhaps be omitted with advantage, as there is, to us, something offensive in the assumption that finite man can penetrate the motives of the Almighty.

*Early Prose and Poetical Works of John Taylor, the Water Poet.* (London: Hamilton, Adams, & Co. 1888.)—In the year 1580 there was born in the city of Gloucester, of humble parentage, John Taylor, subsequently self-dubbed "The King's Majesty's Water Poet," whose earlier works have been collected by the anonymous editor of the volume before us. Of limited education, he was apprenticed to a Thames waterman. During a part of his life he served in the navy, and he also seems to have held some sort of post in the Tower of London, winding up his career as landlord of the "Poet's Head" in Phœnix Alley, Long Acre. He was essentially of a nomadic temperament, having during his career travelled from London to Edinburgh on foot, a journey described in his "Penniless Pilgrimage" in the volume before us; from London to Hamburg, of which we have also his account here; from London to Salisbury in a wherry, whereof he tells here, too, under the title of "A New Discovery by Sea," and so on. His "poetry" is of the school of the poet Close, being but of a doggerel character. It is largely interspersed with prose. He seems to have been a comparatively illiterate man, with strong though

uncultivated powers of observation, and possessed of a share of coarse humour which was more appreciable in the Jacobean age than it is in the Victorian one. As affording a picture of life in Tudor and Stuart times this edition of Taylor's works may be read both with advantage and profit.

*Percy Bysshe Shelley: a Monograph.* By H. S. SALT. (London: Swan Sonnenschein, Lowrey, & Co. 1888.)—Mr. Salt has given us a really readable and agreeable, if somewhat partisan, history of the remarkable poet and original thinker who flashed like a meteor across the sky of the early part of the present century. He retells, always in Shelley's interest, the story of his marriage with Harriet Westbrook, and of his subsequent connection with Mary Godwin, carefully suppressing much that was wholly indefensible, and exaggerating everything for which any excuse can be advanced. It is this too obtrusive advocacy, and the absence of anything approaching the judicial spirit, that weakens the effect of so much that our author advances in Shelley's defence; while every now and then his blind admiration of his idol's Socialistic opinions betrays him into the expression of ignorant utterances concerning Ireland, which will only excite derision in those personally familiar with that unhappy country. The true history of Shelley has yet to be written.

*At Evening Time it Shall be Light.* By LEWIS LAURISTON. (London: The London Literary Society.)—In this wishy-washy religious novelette Mr. Lauriston, like others of his school, constructs his own giants with the express view to their subsequent demolition. "The Hon. Edward Fanshawe," who is an agnostic of the most feeble type (and whose obvious incapacity to give a reason of the hope that is in him renders his opinions after his conversion as valueless as those he professed before it), loses his wife, and subsequently his son, while holding materialistic doctrines, and is plunged into despair. While in this state he wanders into a church where a mission service is going on, and hears a man utter a string of evangelical platitudes—and so on. Those who care for "goody-goodiness" must consult the volume itself to learn what happens to Mr. Fanshawe at the end of it.

*The Life, Times, and Writings of Thomas Cranmer, D.D.* By CHAS. HASTINGS COLLETTE. (London: George Redway. 1887.)—Professing, and undoubtedly intending, to write in a strictly impartial and judicial spirit, Mr. Collette's evangelical principles cause him to view the whole story of the Reformation through coloured spectacles; and to convert him, posing as a judge, into a fervid and altogether one-sided advocate. Nor does it make any difference in the attitude he assumes that the evils of Popery are unhappily but too undeniable, and that we have only to enter any country whatever under priestly domination to find sloth, filth, and degradation, physical and intellectual, rampant. That Cranmer was a potent factor in the English Reformation blinds our author to all his faults and shortcomings, and prompts him to invent a series of excuses for various acts now become historical, which we venture to think he would scarcely otherwise have cared to justify, and which assuredly he would have reprobated in Gardiner or Bonner. But, having said this, we would add that Mr. Collette's work should be read by every one whose ideas of Cranmer's life are derived from such sources as Dr. Littledale's "Ritualistic Innovation," with its low and vulgar scurrility and abuse. The reader approaching the subject with no prepossession will study both, and strike a mean between them. And the partisanship which detracts from the weight of our author's estimate of Cranmer is perhaps even more apparent in his defence of Henry VIII., whose acts and motives are alike presented in a light which would scarcely bear the ordeal of any searching historical criticism. When, after much pestering, the old woman got her minister to pray for rain, and a hailstorm came and cut up all her cabbages, it is recorded that she exclaimed, "Ah! that's just like Mr. Jones—he always *overdoes* everything!" May we hint that, in this respect, Mr. Collette has been taking an easy lesson from Mr. Jones?

*Ballads of Books.* Edited by ANDREW LANG. (Longmans & Co.)—Whoever possesses Mr. Ireland's "Book-Lover's Enchiridion," with its gems of thought on the solace and companionship of books gathered from ancient and modern writers, from Socrates to Louis Stevenson, should not fail to put this delightful anthology of verse in praise of books, from Catullus to Dobson, by its side. The one volume is complementary to the other.

*Our Sentimental Journey.* By JOSEPH and ELIZABETH ROBINS PENNELL. (Longmans & Co.)—As none of the dead authors to whom Mr. Lang addressed his letters have shown signs of offence at the liberty thus taken with them, Mr. and Mrs. Pennell have felt emboldened to dedicate this book to the late Mr. Laurence Sterne, whose route by the old post road from Calais to Lyons they followed, and whose title to his volume of travel they have unblushingly appropriated. But they may rest assured that the Recording Angel of whom that reverend sentimentalist and plagiarist discoursed will drop his tear upon their peccadillo and blot it out for ever. They have told the story of their journey on a tandem tricycle in language which has an apposite old-world flavour. They deserve all the enjoyment which they got out of the trip, for what with drenchings, head-winds, damages to the machine, whose wheels, like those of Pharaoh's chariots, "drave heavily," especially when the top of the oil-can came off, so that "the can was in the oil instead of the oil in the can," and other drawbacks, their course did not run smooth. The map of France is very droll, and the sketches are admirable in their vividness and delicacy.

*Vere Thornleigh's Inheritance*, by A. M. HOPKINSON; *The Trance of Fitzerse*, by ALFRED FITZERSE; *They Twain*, by MARY H. PICKERSGILL-CUNLIFFE. (London: The London Literary Society.)—In "Vere Thornleigh's Inheritance," Miss (or Mrs.) Hopkinson tells how a young woman of gentle birth was brought up by an aunt in an old manor house (in reality her own, though she was ignorant of it) to do farm-work, the said aunt and a woman-servant called Hannah being its only other occupants. Not wholly satisfied with her lot, and in utter ignorance of her parentage, Miss Thornleigh wanders out to an unoccupied house belonging to some people named Tresidder. To her there enter (as the old stage directions have it) one young man, one ditto woman, and one older woman, all singing parts from an opera. These are the Tresidders, who have lost their way to their own house. Vere directs them, and, catching up their song, walks home only to find her aunt in a fit. The old lady dies without revealing the secret of her niece's origin. That niece is found the next morning by a barrister friend of the Tresidders absorbed in grief, and Tresidder *père* volunteering his aid, discovers a pocket-book in a chest in the cellar, containing the name Le Mesurier, which he promptly secretes. Then Miss Thornleigh goes to live with the Tresidders. How the secret of her parentage is subsequently discovered, and her aunt's irrational behaviour more or less satisfactorily explained; how she meets her mother, and how happily the story all ends, the reader must go to the book itself to ascertain. He will find it superior to the run of ordinary novels, and decidedly more interesting than our *précis* of its improbable opening incidents would induce him to anticipate.

"The Trance of Fitzerse" has fairly puzzled us, as, after the most attentive and deliberate perusal of it, we wholly

fail to discover what its author is driving at. If the part relating to the Stuart period in Pinnock's "Goldsmith's History of England," an essay by Dr. Littledale, any of the productions of Messrs. Blavatzky, Olcott, Sinnett & Co., Limited, an odd number of "Light," and a chapter from Carpenter's "Mental Physiology," were passed through a sausage-machine, "The Trance of Fitzerse" might well emerge as the result of the combination. Whether the author of this curious hash intends it as a psychological study, and as a more or less accurate narration of a peculiar form of mental alienation, or whether he has been addling himself with the drivelling nonsense of "Spiritualism," and really believes that the incongruous and inconsequent series of occurrences of which he tells might have happened, we cannot divine. Of plot—in any legitimate sense of that word—there is none. A Fitzerse, whose father loses his life in the cause of that perjured and worthless ruler, Charles I., studies medicine at Padua, performs experiments in transfusion, and makes a bosom-friend of a certain Sal Tara Lal, studying under the pseudonym of Saltario, and who subsequently appears in London as Dr. Salter at the time of the Plague. This extremely uncanny person was—or is—a Yogi, or Mahatma ("for which," to paraphrase the immortal Cap'en Cuttle, "overhaul your Blavatzky, and when found make a note of"), and he bottles up, so to speak, all Fitzerse's vitality, and throws him into a trance in the seventeenth century from which he does not rouse until near the end of the nineteenth, only to find himself occupying the place of one of his own lineal descendants. It is not surprising to learn that he is sent to a private asylum as the result of an endeavour to impress the truthfulness of the narrative we have sketched on his friends. We must say, though, that they carried their incredulity very far on the occasion when the author, wholly ignorant of, and without the slightest ear for, music, extemporaneously performed a brilliant capriccio on the violin which he must have learned in Italy about 1658 or so. The book, as we have previously said, has no plot. A variety of characters appear and disappear, having no connection with the story, and in nowise helping it. Our pervading impression after its perusal is that its author has made notes of various incidents that their archæological correctness may give an air of vraisemblance to his tale, and has emptied them bodily into his pages, with a fine disregard for congruity. As a novel the book is worthless; but it will somehow repay reading for all that.

Of "They Twain" we may say, as the schoolboy did of the milk-and-water, "This is indeed weakness!" A young woman of the middle class, who has been brought up amid such refinement as is involved in five o'clock tea and dinner at night, marries a farmer, and has her feelings hurt and her affections estranged by his plebeian habit of taking his principal meal at midday, and so on. By-and-by her child dies, she becomes reconciled to the manners and customs of the agricultural classes, and they live happily ever afterwards. *Voilà tout!*

Of works of a more miscellaneous character we have already the second edition of Mr. S. R. Bottone's capital *Electrical Instrument-making for Amateurs*, the first of which we noticed on page 212.—*Mining and Quarrying*. By J. H. Collins, F.G.S. 2nd Edition. (London: Crosby Lockwood & Co. 1888.)—A first-rate little manual for the beginner.—*The Medico-Legal Journal*. (New York: March 1888.)—A serial of considerable interest to all who study medical jurisprudence; containing, *inter alia*, a somewhat maudlin article by Dr. Bleyer on "The Best Methods of Capital Punishment," with a report to match from a committee.—*Hylo-Idealism or Auto-Centricism*. By (H. L. C.). (London: Watts & Co.)—"Crambe repetita" of Dr. Lewins's craze.—*A Special Constable's Story and other Tales*. By Henry Charles Moore. (London: Wyman & Sons. 1888.) Sketches-by-Boz-and-water.—*Annual Reports of the Aeronautical Society of Great Britain for* 1885–86. (London: Hamilton & Co.)—Containing much that is visionary.—*Electricity* v. *Gas*. By John Stent. (London: Swan Sonnenschein & Co.)—An enthusiastic prediction that coal gas and mineral oil as sources of light will disappear before electricity. Page 56 is nonsense pure and simple.—*The Theory of the Tides*. By James Nolan, F.G.S.A. (London: Dulau & Co.)—Worth reading.—*Internationales Archiv für Ethnographie*. Edited by J. D. E. Schmeltz. Band I. Heft III. (London: Trübner & Co.)—Fully sustains its interest. The illustrations are as beautiful as ever.

We have also on our table the two concluding volumes of Miss Amy Baker's *First History of the English People* (London: Swan Sonnenschein, Lowrey, & Co. 1888), bringing the narrative down to Queen Victoria's Jubilee; two or three tracts by Mr. Laurence Hargrave devoted to flying machines; their very full and complete *Catalogue of Photographic Apparatus* from Messrs. J. Lancaster & Son, Birmingham; divers tracts from the National Association for the Promotion of Technical Education; *The Report of the Superintendent of the American Nautical Almanac* for the year ending June 30, 1887, a record of a mass of valuable work; *Physical and Industrial Training of Criminals*. By Hamilton D. Wey, M.D. Records of an attempt to place the confirmed scoundrel in a position of very great advantage over the merely honest hard-working man; Ἄσβεστος. By Robt. H. Jones. (London: Crosby Lockwood & Co.) A description of the localities where asbestos is found, the method of obtaining it, and the uses to which it is put; *Cassell's Technical Educator* (London: Cassell & Co.); also among various educational works, *Competitive Examination Papers in Pure Mathematics* (Stages I.–III.); *Letters, Themes, and Essays for Composition*, and *Short Stories*, selected by J. M. Laine, M.A. (all from Moffatt & Paige); *Hints to Calculators* and *Sensational Arithmetic*. By H. Bull. (London: Hamilton, Adams, & Co.) Devices for making every man his own Bidder or Zerah Colburn; and *The Elements of Logarithms*. By W. Gallatly, M.A. (London: Francis Hodgson.) An excellent, thoroughly plain and practical little manual.

## THE FACE OF THE SKY FOR SEPTEMBER.

By F.R.A.S.

THE spotless sun is wholly void of interest as an object in the telescope. Towards the end of the month the zodiacal light may be seen in the east before sunrise. September 22 is the theoretical date of the equinox; but equality of day and night in London will not occur until the 24th. Map ix. of "The Stars in their Seasons" exhibits the aspect of the night sky. Minima of the variable star Algol ("The Stars in their Seasons," map xii.) will occur at 11h. 26m. P.M. on the 14th, and at 8h. 15m. P.M. on the 17th, as well as on other occasions more inconvenient for the ordinary observer. Mercury is an evening star, but is poorly placed in Leo and Virgo for observation. Venus, in Virgo, is, of course, an evening star, too, but is just as badly placed as Mercury. Mars and Jupiter are close to the western horizon at dusk, while Saturn, Uranus, and Neptune are quite invisible. Hence, as far as the planets are concerned, the night sky is a blank. The moon is new at 4h. 56.1m. A.M. on the 6th, enters her first quarter at 9h. 59.9 P.M. on the 12th, is full at 5h. 24.3m. A.M. on the 20th, and enters her last quarter at 8h. 30.2m. A.M. on the 28th. Four occultations of fixed stars by the moon will happen at convenient hours for the amateur observer during September. The first occurs on September 1, when the 6th magnitude star 61 Geminorum will disappear at the moon's bright limb 4m. after midnight at an angle of 84° from her vertex. It will reappear

at her dark limb at 12h. 50m. at an angle from her vertex of 216°. The second is on September 14, on the night of which at 10h. 58m., 50 Sagittarii, of the 6th magnitude, will disappear at the dark limb of the moon at an angle from her vertex of 134°; she will though have set prior to its reappearance. Thirdly, on the 16th, 30 Capricorni will disappear at her dark limb at 9h. 47m. P.M., at an angle of 128° from the vertex of the moon, and will reappear at her bright limb at 11h. 1m. P.M. at a vertical angle of 28°. Finally, on the 28th, before the moon rises, she will have occulted $\zeta^2$ Geminorum of the 4th magnitude. Its reappearance may be observed later on at 11h. 11m. P.M. at her dark limb, at an angle of 245° from her vertex. When our notes begin the moon is in Gemini ("The Seasons Pictured," plate xxiv.), through which she is travelling until 2h. 30m. P.M. on the 2nd, at which hour she enters Cancer. She remains in Cancer until 4h. A.M. on the 4th, and then passes into Leo. Her journey through Leo occupies her until 6h. P.M. on the 6th, when she crosses into Virgo ("The Seasons Pictured," plate xxv.). It is not until 7h. P.M. on the 9th that her passage through this great constellation is completed, and she has entered Libra ("The Seasons Pictured," plate xxvi.). Travelling over Libra she arrives at 11h. 30m. A.M. on the 11th on the western edge of the narrow northern spike of Scorpio, which she has crossed by 8h. 30m. the same evening and emerged in Ophiuchus. She leaves Ophiuchus at 9h. A.M. on the 13th, and enters Sagittarius. There she remains until 5 P.M. on the 15th, when she leaves it in turn for Capricornus ("The Seasons Pictured," plate xxi.). At 3h. 30m. P.M. on the 17th she quits Capricornus for Aquarius. Her passage over Aquarius terminates at 4h. 30m. P.M. on the 19th, when she enters Pisces ("The Seasons Pictured," plate xxii.). In the course of her journey across Pisces she passes into a part of Cetus at noon on the 20th, in which constellation she continues until 7 P.M. on the 21st, re-emerging in Pisces at the hour last named. It is only, however, to plunge into another outlier of Cetus twenty-four hours later (*i.e.*, at 7h. P.M. on the 22nd), and, when she finally quits this at 8 A.M. on the 23rd, it is to come out in Aries ("The Seasons Pictured," plate xxiii.). By 2h. P.M. on the 24th she has traversed Aries, and quitted it for Taurus. In the course of her journey through Taurus she arrives at 6h. 30m. P.M. on the 27th on the boundary of the most northerly portion of Orion. It takes her until 2h. 30m. A.M. on the 28th to cross this, and when she has done so she comes out in Gemini ("The Seasons Pictured," plate xxiv.). She passes out of Gemini into Cancer at 11h. 30m. P.M. on the 29th. There we leave her at midnight on the 30th.

A REMARKABLE RIDE.—Mr. Chas. Hill, of the Finchley Harriers, on August 10, accomplished a remarkable ride on a "Geared Facile" bicycle, having ridden no less than 293 miles in the 24 hours, only 2 miles less than the record standing to the credit of Mr. G. P. Mills, and 21 miles more than all other previous performances. This splendid ride, on the hottest day we have had this year, is a great performance for both man and machine, more especially in view of the fact that Mr. Hill had only ridden a "Facile" for a month previously to the start. He rode the same machine throughout—a 46-inch, geared to 69 inches, weighing about 36 lbs., and is quite confident that with all circumstances favourable he can cover over 300 miles in 24 hours on a "Geared Facile," of which he speaks in the highest terms.

## Our Whist Column.

BY "FIVE OF CLUBS."

THE solution of Mr. Lewis's double dummy problem (see January Number of KNOWLEDGE) is as follows. We repeat the problem for the reader's convenience:—

THE HANDS.

*B* { H. (*trumps*).—A, Kn, 8, 6, 5. C.—A, K, Kn, 4.
S.—2 D.—A. 6, 4. }

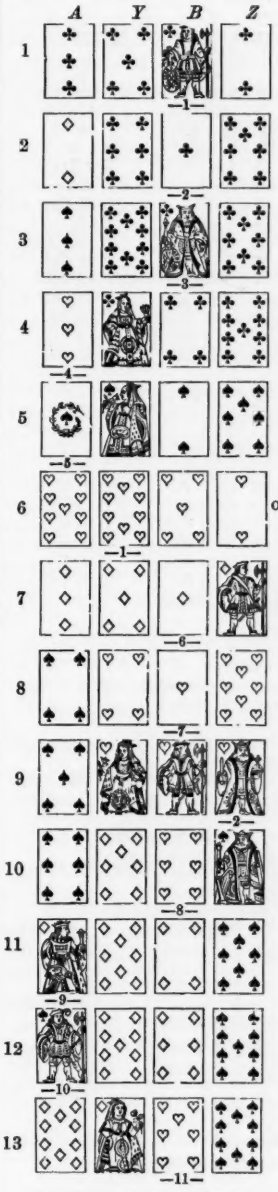
*Y* { H. (*tps.*).—Q, 10, 4. S.—Q. C.—Q, 10, 6, 5. D.—Q, 9, 8, 7, 5. }

B / Y Z / *Tr.* Hearts / A leads.

*Z* { H. (*tps.*).—K, 7, 2. S.—K, 10, 9, 8, 7. C.—9, 8, 7, 2. D.—Kn. }

*A* { H. (*trumps*).—9, 3. S.—A, Kn, 6, 5, 4, 3. C.—3. D.—K, 10, 3, 2. }

Hearts are trumps. A leads. How many tricks can A-B make against the best defence?




A and B make five by tricks.

NOTES.

It will be seen on a careful study of the position that for full success A and B must make one trick by ruffing Clubs, while Y and Z must be prevented from making Trumps by ruffing. Further, either Z must be compelled to lead Spades after the Ace is out, or Y to lead a Diamond after Ace is out and Trumps are exhausted. Everything then depends on rightly placing the lead when Y's and Z's trumps are out. By the line of play indicated above A and B clear out the Clubs from Y-Z's hands, so that every lead must now necessarily be from Diamonds or Spades when Trumps are out. Moreover, by leading the Spade Ace at trick 5, A clears Y of Spades also. Note the effect of omitting this lead. Y covering the Heart Nine will lead a small Diamond, which either A or B must win. If A wins, he has no better course than to lead Spade Ace, following with a small one, which Y will trump with the Queen, after which, no matter how B may play, Y-Z must make two more tricks in trumps. (The same result must follow if B wins the first round of Trumps as actually played above.) If B, on the contrary, wins, he must then take out two rounds of Trumps as his best chance; and Y-Z will be able to get rid of the lead by leading a Spade, and thus make a Spade or a Diamond, besides two Trump tricks.

In fact, A has to lead out the Spade Ace to prevent the lead being forced into his hand; and B must, in like manner, lead out, or get out (according to his position) the Diamond Ace before drawing the second round of Trumps. Thus, if Y leads a Trump at trick 7, B wins with the Ace, leads Diamond Ace, and then goes on as above with Heart Knave.

| * | *A* | *Y* | *B* | *Z* |
|---|---|---|---|---|
| 6.— | H 9 | H 4 | H 5 | H K |
| 7.— | S 4 | H 10 | H Kn | S 7 |
| 8.— | D 3 | D 5 | D A | D Kn |
| 9.— | D 10 | H Q | H A | H 2 |
| 10.— | S 5 | D 7 | H 7 | H 8 |
| 11.— | S 6 | D 8 | H 6 | S K |
| 12.— | D K | D 9 | D 4 | S 9 |
| 13.— | S Kn | D Q | D 6 | S 10 |

If, in this variation, Y discards a Diamond at trick 7, B wins the trick with Heart 6, then leads out in succession Diamond Ace, Heart Ace, and Heart Knave. On this, if Z at trick 9 should throw Heart King to the Ace, to allow Y to win trick 10, then A must discard a Spade instead of a Diamond at trick 9. Otherwise the game will run as before.

XUM

# Our Chess Column.

BY "MEPHISTO."

## GAMES PLAYED IN THE TOURNAMENT OF THE B.C.A. AT BRADFORD.

| WHITE. Mr. Blackburne. | BLACK. Mr. Lee. | WHITE. Mr. Blackburne. | BLACK. Mr. Lee. |
|---|---|---|---|
| 1. P to K4 | P to K3 | 28. Q to Qsq | B to Qsq |
| 2. P to Q4 | P to Q4 | 29. Q to Q2 | B to R4 |
| 3. Kt to QB3 | Kt to KB3 | 30. K to B2 | B × B |
| 4. P to K5 (*a*) | KKt to Q2 | 31. KR × B | R × R |
| 5. P to KB4 | P to QB4 | 32. R × R | R × R |
| 6. P × P (*b*) | B × P | 33. Q × R | Q to B5 |
| 7. Q to Kt4 (*c*) | P to KKt3 (*d*) | 34. Q × Q (*j*) | P × Q |
| 8. Kt to KB3 | Kt to QB3 | 35. K to K3 | K to B3 |
| 9. B to Q3 (*e*) | Kt to Kt5 | 36. K to K4 | P to Kt4 |
| 10. B to Q2 | Kt to Kt3 | 37. P to Q5 (ch) (*k*) | P × P (ch) |
| 11. P to R3 | Kt × B (ch) | 38. K to Q4 | P to KR5 |
| 12. P × Kt | B to Q2 | 39. P to KR3 | P to R4 |
| 13. R to QBsq | R to QBsq | 40. P to B5 | P × P |
| 14. Q to R3 | Kt to R5 (*f*) | 41. P to K6 | K to Q3 |
| 15. Kt × Kt | B × Kt | 42. P × P | K to K2 |
| 16. P to Q4 | B to K2 | 43. P to Kt6 | P to B5 |
| 17. Castles | B to B7 (*g*) | 44. K to B3 | P to Kt5 (ch) |
| 18. B to B3 | B to KB4 | 45. P × P | P × P (ch) |
| 19. P to KKt4 (*h*) | B to Q6 | 46. K to Q4 | K to Bsq |
| 20. KR to Ksq | R to B3 | 47. K to K5 | K to K2 |
| 21. Kt to Q2 | B to B5 | 48. K × BP | P to B6 |
| 22. R to K3 | P to KR4 | 49. P × P | P to Kt6 |
| 23. Kt to Bsq | K to Q2 (*i*) | 50. K to Kt5 | P to Kt7 |
| 24. P to Kt5 | B × Kt | 51. K to R6 | P Queens |
| 25. Q × B | Q to Kt3 | 52. K to Kt7 | Q to Ktsq |
| 26. Q to Qsq | KR to QBsq | 53. K to R7 | K to B3 |
| 27. Q to R4 | Q to R3 | Resigns. | |

NOTES.

(*a*) Some players prefer this continuation to 4. B to KKt5, the German masters (recently) in particular.

(*b*) This was played by Steinitz *v.* Golmayo, at Havanna.

(*c*) As played by the late Dr. Zukertort against Gunsberg, in this year's Handicap of the British Chess Club.

(*d*) Pollock considers that Black can risk Castling at this juncture, P to KB4 being an important feature in the defence.

(*e*) The QB ought to be played first, as the placing of the other B on Q3, where it can be at once attacked by the Knight, is not advantageous for White.

(*f*) This move simplifies the game in Black's favour.

(*g*) Bringing his Bishop into a better position presently.

(*h*) It is always hazardous to expose the King in this way as long as the opponent has two Bishops on the board.

(*i*) Threatening, with good judgment, to open the Rook's file.

(*j*) After all these exchanges White is found to have suffered in position, solely due to the fact that he attempted to avoid the drawing line of play, which his adversary seemed bent to force upon him.

(*k*) Black has the opposition, and would soon be able to gain the Queen's Pawn, having various moves at his disposal, in order to gain time, and thus compel the White King to abandon the defence of that Pawn. Seeing this, White adopts the masterly but desperate course of sacrificing that Pawn at once, and others subsequently, the ingenious combination, however, being frustrated by Black's accurate play.

## EVANS'S GAMBIT REFUSED.

| POLLOCK. | MASON. |
|---|---|
| 1. P to K4 | P to K4 |
| 2. KKt to B3 | QKt to B3 |
| 3. B to B4 | B to B4 |
| 4. P to QKt4 | B to Kt3 |
| 5. P to B3 | Kt to B3 |
| 6. P to Q3 | P to Q3 |
| 7. B to KKt5 | P to KR3 |
| 8. B to R4 | P to KKt4 |
| 9. B to KKt3 | |

Up to the present the game calls for no comment. In similar positions the Knight can sometimes be sacrificed, but it will not do here, supposing 9. Kt × P, P × Kt; 10. B × P, B × P (ch)!; 11. K × B (if K to Bsq, B to R5), Kt × P (ch), with the better game.

| | |
|---|---|
| | Kt to K2 |
| 10. Q to Kt3 | |

In order to induce Black to Castle,

| | |
|---|---|
| | Castles |
| 11. QKt to Q2 | Kt to Kt3 |
| 12. P to KR4 | P to Kt5 |
| 13. P to R5 | Kt to B5 |
| 14. B × Kt | P × B |
| 15. Kt to R4 | P to B3 |

To guard against the loss of the exchange. For if White (after P to B3) should play Kt to Kt6, Black would reply with P to Q4, gaining two pieces for his Rook.

| | |
|---|---|
| 16. Q to B2 | P to Q4 |
| 17. B to Kt3 | P to R4 |
| 18. P × RP | B × P |
| 19. Cas. to QR | B to K3 |
| 20. P to Q4 | R to Bsq |
| 21. P to K5 | Kt to R2 |

If Black plays Kt × P, White might revive his attack against the King's side. The White Rook's Pawn is more of a protection to Black; moreover, it is bound to fall in the end game.

| | |
|---|---|
| 22. Kt to B5 | |

Kt to Kt6 is a much superior move, viz., 22. Kt to Kt6, P × Kt; 23. Q × P(ch.), K to Rsq; 24. Q × B, B × P; 25. Kt to Kt sq; with better attacking chances than occurred in the actual game. Of course, if Black refuse to take the Kt on the 22nd move, but plays R to Ksq instead, White simply replies 23. Kt × BP.

| | |
|---|---|
| | Q to Kt 4 |
| 23. Kt to Q6 | P to QB4 |

A very fine and undoubtedly preconceived operation.

| | |
|---|---|
| 24. Kt × R | R × Kt |
| 25. P to QB4 ? | BP × P |
| 26. B to R4 | B × Kt(ch.) |
| 27. K × B | R × P |
| 28. Resigns * | |

## FOUR KNIGHTS' DEFENCE.

| WHITE. A. Burn. | BLACK. J. Mortimer. | WHITE. A Burn. | BLACK. J. Mortimer. |
|---|---|---|---|
| 1. P to K4 | P to K4 | 9. Kt to K1 3 | B to KKt5 |
| 2. Kt to KB3 | Kt to KB3 | 10. P to KR3 | B to K3 |
| 3. Kt to QB3 | Kt to QB3 | 11. B to Kt5 | P to KR3 |
| 4. B to Kt5 | B to Kt5 | 12. B to R4 | P to KKt4 |
| 5. Castles. | Castles. | 13. Kt × P | P × Kt |
| 6. P to Q3 | P to Q3 | 14. B × P | Q to Q2 |
| 7. B × Kt | P × B | 15. B × Kt | B × RP |
| 8. Kt to K2 | B to QR4 | 16. Q to KR5 | Resigns |

* If 28. Q to Kt3, P to B6(ch.); 29. K to Ksq, P × P; 30. KR to Kt sq, Q × P(ch.); 31. K to Q2, Kt to Kt4! and wins.

THE LOISETTE SYSTEM.—Mr. G. S. Fellows, M.A., published in New York a pamphlet claiming to contain "Loisette's Complete System of Memory," and proves (as an excuse for printing) that Professor Loisette's System was not original. The question was tried in the Supreme Court of New York, before Chief Justice Vambrunt, on July 26, 1888. Dr. William A. Hammond, author of several works on the mind and the nerves; Daniel Greenleaf Thompson, author of "A System of Psychology" (Longmans, 1884), and others, testified that the Loisettian System is original, being a new departure in the education of the Memory, and is of great value. The Supreme Court made perpetual an injunction restraining Mr. Fellows from publishing his pamphlet, and ordered him to deliver to Professor Loisette the stereotype plates and books. The pamphlets delivered up numbered over 9,000.

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